THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XXXIII JUNE, 1936 ABST. No. 2

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Old Tuberculin and Tuberculoproteins.—An analysis of the author's data combined with that of other investigators indicates that within the range of dosage used to date, the fractions of tuberculin precipitated by ammonium sulphate or by trichloracetic acid (0.000,5 and 0.001 mgm.) are not significantly superior to Old Tuberculin (0.01 and 0.02 mgm.) so far as efficiency in detecting tuberculously infected children is concerned. In adults, on the other hand, small amounts of human-tubercle-bacillus protein elicit positive reactions in significantly more individuals than do comparable doses of tuberculin, possibly because allergy to the large or aggregate protein molecule persists longer than to the smaller molecule of O.T. The use of these precipitates for testing adults is, however, inadvisable because of their apparent property of rendering uninfected, nonallergic individuals sensitive to tuberculin.—*Old Tuberculin, Human Tubercle Bacillus Protein, and Trichloracetic Acid Precipitate, C. A. Stewart, Am. J. Dis. Child., March, 1935, xlix, 625.*—(*M. D.*)

Tuberculin Allergy and Acute Diseases.—A depression of the local skin reaction to tuberculin has been reported in measles, pertussis, typhoid fever, typhus, phenyl-ethyl-hydantoin reactions, mycosis fungoides, lymphogranulomatosis, roentgen-ray exposure, and to dietary variations. The authors found in a large series of cases that a depression of tuberculin allergy occurs during the acute stages of scarlet fever and probably measles. No statistically significant effect could be demonstrated in cases of diphtheria or any other communicable diseases.—*Studies in Immunity: V. Effect of Acute Diseases on the Reaction of the Skin to Tuberculin, A. G. Mitchell, et al., Am. Jour. Dis. Child., March, 1935, xlix, 695.*—(*M. D.*)

Antigenic Properties of Various Tuberculin Fractions.—It has been previously shown that the capacity to elicit a tuberculin skin reaction may reside in a whole series of molecules of widely different molecular sizes, ranging from about 25,000 down to about 2,000, the latter being the smallest active molecule so far isolated. The smallest molecule was approximately equal in skin potency per milligram of nitrogen to the largest molecule, and that very little, if any, of the total potency was lost in transforming the large molecule into the small one, thus indicating that the larger one is probably an aggregate of the small specifically active units. It has also been shown that the large molecule, or that having

molecular weight of about 25,000, was by far the best antigen, that is, a true antigen, able to elicit antibodies, while the smallest one of about 2,000 molecular weight was practically nonantigenic in this sense. The present experiments have to do principally with the possibility of rendering antigenic the active but not antigenic unit of tuberculin by adsorbing it on aluminum or charcoal. Rabbits were injected with a protein (M9) obtained from unheated tuberculin cultures to produce antiserum of high precipitin titre. This protein had a molecular weight of about 25,000. Other animals were injected as follows: two with *SOTT*, two with *SOTT* adsorbed to aluminum hydroxide and two with this protein adsorbed to charcoal. *SOTT* is a tuberculin protein derivative and consists largely of small molecules. Precipitin tests were done with sera from the different groups of rabbits using M9 and *SOTT* as antigens. These antigens also were used for skin-testing the rabbits. Finally, *SOTT* was added to a potent antiserum to see whether the precipitin reaction would be inhibited. *Results:* The purified tuberculin protein dermatine *SOTT* is not able by itself to stimulate the production of antibodies. However, when antibodies are present in the blood-stream elicited by means of the whole or large protein tuberculin molecule, then the *SOTT*, of small molecular size, is able to react specifically, giving the precipitin test and Arthus reaction. Furthermore, if the small *SOTT* molecule is adsorbed to an inert colloid, such as aluminum hydroxide, or to a particle, such as charcoal, then it becomes truly antigenic and is able to stimulate the production of antibodies. *SOTT* is able to inhibit the precipitin reaction between the whole tuberculin protein antigen and its antibodies. The above findings indicate that *SOTT* occupies a position intermediate between full antigens and typical haptens.—*The Chemical Composition of the Active Principle of Tuberculin. XIX. Differences in the Antigenic Properties of Various Tuberculin Fractions; Adsorption to Aluminum Hydroxide and Charcoal, F. B. Seibert, J. Immunol., June, 1935, xxviii, 425.*—(*J. S. W.*)

Allergy and Tuberculous Lesions.—Much significance is attached to the relation of the allergic state to anatomical changes (lesions) in tuberculosis. It is now generally believed that necrosis in tuberculous lesions is dependent on the allergic state. Previous studies showed that rabbits, inoculated subcutaneously with living *BCG*, commonly became allergic, but those given intravenous injections of heat-killed *BCG* never became allergic. Following these observations it was decided to vaccinate rabbits by different methods, and test for allergy and lesions, in order to determine whether or not the lesions present have any relation to allergy from the standpoint of either cause or effect. Four groups of rabbits were injected weekly with 1 mgm. of *BCG* as follows: Two of the group received living organisms, one subcutaneously and the other intravenously. The other two received heat-killed organisms; also one subcutaneously and the other intravenously. The Mantoux test for allergy was regularly made three weeks after the last injection of the *BCG*. Another series of rabbits was made allergic by the subcutaneous injection of a single dose of 4 mgm. of living *BCG*. After these animals became allergic they were given an intravenous injection of living or heat-killed *BCG* in doses which seldom produced lesions in normal animals. In the first series, animals receiving weekly doses of *BCG*, allergy was never detected except in animals in which lesions could be found. In some cases lesions were present without allergy (intravenously vaccinated), but when this was so the lesions were usually slight and of little extent. In the animals made allergic before receiving the intravenous injections, extensive lesions in the lungs, livers and spleen were observed. The allergic state seemed to cause a marked increase in susceptibility to the development of lesions. Control animals (nonallergic) injected at the same time showed no lesions. These experiments support the belief that without a lesion in tuberculous infection there is no allergy and that an allergic animal is more susceptible to the development of lesions from equal subsequent infection than the nonallergic animal.—*Relation of Allergy and Lesions in Animals Vaccinated with BCG, B. J. Clawson, Arch. Path., May, 1935, xix, 673.*—(*J. S. W.*)

"Tuberculin Type" Reaction with Ordinary Protein Antigens.—Dienes and Schoenheit injected horse-serum, egg-white or extract of timothy pollen into the lesions of tuberculous guinea pigs. In these animals the later intracutaneous injection of the protein elicited indurated and necrotic skin reactions closely simulating the tuberculin reaction. The necrotic response occasionally occurred in the absence of the "immediate" (anaphylactic) skin reaction or of demonstrable antibody, and could never be passively transferred to normal animals by means of blood-serum. In the present article an attempt was made to confirm the above observations and to study the part played by the tubercle and the inflammatory reaction of the early tuberculous lesion in

the production of tuberculin hypersensitiveness. Guinea pigs were injected in the groin with virulent and avirulent tubercle bacilli and later either horse-serum or egg-white was injected into the resulting lesions (enlarged nodes). Ordinarily 0.1 cc. of undiluted horse serum or 10 per cent egg-white was injected for the purpose of sensitization. One-tenth cubic centimetre of horse-serum or of egg-white, as indicated, diluted 1:10 and 1:50 respectively, was employed in performing the intracutaneous skin tests. Immediate (anaphylactic) skin reactions occurred frequently, delayed skin reactions less frequently. The latter were reddened, persistent, necrotic reactions, appearing late as in the tuberculin reaction. In many instances both the "immediate" (soft oedematous wheal) and the "delayed" (necrotic) reactions appeared successively in the same skin test. Under such circumstances it was necessary to insist on delayed necrosis of the skin-test area as a final criterion of the "tuberculin type" of hypersensitiveness. This, however, occurred with sufficient frequency to confirm the findings of Dienes and Schoenheit. It was also found impossible to passively transfer this "tuberculin type" hypersensitiveness to other animals. It seemed possible that the local collection of the fairly specific and distinctive group of cells constituting the tubercle with their attendant enzymes might produce an alteration in the antigen injected into such tissue and thus induce a modification of the usual anaphylactic hypersensitiveness. However, the injection into guinea pigs of sterile filtrates from tuberculous-tissue-horse-serum digests only resulted in the development of the "immediate" (anaphylactic) type of skin hypersensitiveness. In another experiment "anatomical tubercles" were built up in animals by the repeated injections of the phosphatide fraction of the human tubercle bacillus. The injection of horse-serum or egg-white into these lesions produced only the anaphylactic type of hypersensitiveness similar to that developed by the sensitized normal controls. As previously reported by Dienes and Schoenheit, the delayed type of hypersensitiveness to egg-white resulted from the injection of this antigen into testicular lesions within 18 hours following the infection, and this method proved superior to any other for producing this type of reaction. This finding affords evidence that the tubercle is not necessary for the production of the "tuberculin type" of hypersensitiveness. The influence of the early testicular lesions was shown to be localized: the intravenous, intraperitoneal and subcutaneous injection of the antigen into guinea pigs with twenty-four-hour tuberculous lesions in the testicle did not produce the tuberculin type of hypersensitiveness. Infected testicles were removed in from six to twelve hours after the injection of horse-serum into the early tuberculous lesion. All animals thus treated developed the "tuberculin type" of hypersensitiveness as readily as did noncastrated controls. The injection of horse-serum and egg-white into acute and chronic inflammatory processes which had been incited by a variety of irritating substances, including several species of bacteria, resulted in no delayed hypersensitiveness. Furthermore, the removal of one testicle twenty-four hours after infection, followed by the injection of horse-serum into the opposite non-inflamed testicle caused the development of the delayed hypersensitiveness. Besides confirming the work of Dienes and Schoenheit, the findings would indicate that the factors which promote the tuberculin type of hypersensitiveness may be sought elsewhere than in the primary tuberculous lesion and that tuberculin hypersensitiveness, itself, is brought about by the same factors.—*The Mechanism of Tuberculin Hypersensitiveness. The Rôle of the Tubercle and of the Inflammatory Reaction of the Early Tuberculous Lesion in the Production of Tuberculin Hypersensitiveness as Determined by Inducing the "Tuberculin Type" of Hypersensitiveness with Egg White or Horse Serum, J. H. Hanks, J. Immunol., February, 1935, xxviii, 105.*—(*J. S. W.*)

Local Skin Reactivity to Tuberculin.—When the skin of normal rabbits is rendered vulnerable by the intracutaneous injection of certain soluble bacterial factors the later intravenous injection of homologous or heterologous bacterial filtrates may result in a necrotic reaction at the site of the first (intracutaneous) injection. The present article discusses the ability of various preparations from cultures of tubercle bacilli to produce or elicit this phenomenon. In a group of rabbits an undiluted filtrate of human tubercle bacilli and several batches of tuberculin (O.T.) properly diluted were each used both for the preparation of the skin and intravenous injection 24 hours later. No reactions occurred. When the skin was prepared with different tuberculins and *B. typhosus* filtrate used for the intravenous injection, the tuberculins prepared in the author's laboratory were capable of inducing the reactivity, whereas the New York Board of Health tuberculins and purified T.P.T. tuberculin consistently failed. In another group of normal rabbits meningococcus and *B. typhosus* culture filtrates of ascertained skin-preparatory potency were

employed for intracutaneous injections. Various batches of tuberculin were injected intravenously 24 hours later; severe reactions resulted with five but failed with three preparations. It is seen from these experiments that tuberculin contains in low concentration the factors necessary for the elicitation of the phenomenon. The reaction cannot be obtained unless nontuberculous bacterial filtrates of high potency are used either for the skin preparation or for the intravenous injection. From the fact that the Health Department tuberculins and the T.P.T. were completely inactive in eliciting the phenomenon it is apparent that the factors necessary for this are not related to tuberculin substances proper. Fifteen groups of three normal rabbits were each given weekly single intracutaneous injections of bacterial filtrates of ascertained skin-preparing potency (meningococcus and *B. typhosus*). Twenty-four hours after each intracutaneous injection the rabbits received intravenously various tuberculins and filtrates of tubercle-bacillus cultures. Following the first intravenous injection no reactions appeared at the prepared sites. After the second injection one group showed reactions and at the end of seven weeks, three-fourths of the groups. It was found that preparations which failed to elicit reactions on a single intravenous injection were able to do so on weekly repeated intravenous injections. The nature of the toxic substance responsible for these reactions is not known. It apparently is not related to tuberculin substances proper, for the reactions occur in the absence of tuberculous foci.—*Phenomenon of Local Skin Reactivity to Bacillus Tuberculosis. I. Skin-Preparatory and Reacting Potencies of Tuberculin, O.T., and Bacillus Tuberculosis Culture Filtrates, G. Schwartzman, J. Exper. Med., March 1, 1935, lxi, 369.—(J. S. W.)*

Reinfection and Resistance to Tuberculosis.—Tuberculosis presents problems of great difficulty and, while all agree to its potential infectiousness, there is much disagreement on the degree of this and on the practical measures for prophylaxis. While most authorities believe there is danger in intimate association with a consumptive, a few maintain there is no danger, regarding the ordinary so called adult type as a late manifestation comparable to tabes or aneurysm in syphilis. This seems a very dangerous doctrine and it would follow that, once infected (reacting to tuberculin) no precautions against contact need be taken. Burrell considers that, fundamentally, all forms of tuberculosis after the initial incubation period, are the same. Acute and chronic forms, like day and night, pass imperceptibly almost into one another. Moreover, Koch's phenomenon is not confined to tuberculosis, specific allergic reactions being set up by nearly all microbic infections. If by the term "primary infection" we mean the effect of the action of bacilli on a nonallergic or nonsensitized body the primary manifestations are those occurring between the entrance of the bacilli and the later development of the allergic state. In the vast majority such infections present no definite symptoms or sense of illness. In some a few symptoms occur from which the patient recovers and in a few general and fatal tuberculosis results. The result of primary infection probably depends on its size in relation to the natural resistance of the individual. Symptoms of illness may be regarded as secondary, no matter how long after the initial infection they appear. If the infection is massive the patient is destroyed before adequate defenses can be mobilized, as with acute miliary tuberculosis. Its microscopic pathology, however, does not differ from that of other types of the disease. *Dosage of infection:* Tuberculin tests show that the vast majority of persons receive a dose of infection which never produces obvious illness, its course having been modified by the natural resisting powers and overcome. But this can scarcely alter fundamentally the effects of later infections, whether endogenous or exogenous. It is illogical to consider the body susceptible to the original bacilli and their descendants, but immune to tubercle bacilli entering from without. Thus, acquired immunity is only partial, tending to fix the bacilli or check their rate of spread by immediate inflammatory reaction. The term "tolerance" is preferable, as this partial protection varies greatly, waxes and wanes from time to time. To use the terms "immune" and "nonimmune" in tuberculosis has as little basis in fact as to use them in connection with the tendency to get drunk after alcohol imbibition. The animal does adjust itself to environment and the race may acquire resistance by continuous exposure to small doses of tubercle bacilli. In practice, a sudden massive exposure often is shown to lead to active disease, such exposure being in the form of intimate association with a source of massive infection. When the exposure is drawn out over a long period of time the sum of such infections usually results in a chronic fibroid form of disease with but little impairment of the general health. In the case of arrested tuberculosis, if there is a relapse it usually shows itself in the form of activity at or near the old focus, the disease remaining essentially local. In the

case of haemoptysis out of a clear sky or pleurisy with effusion, the pulmonary focus may not be detectable. Thus, a patient may have repeated mild attacks of activity with but little impairment of health, yet the disease is developing into a chronic fibroid type. When the activity reaches a certain pitch symptoms of illness occur.—*Development of extrapulmonary complications:* Bacilli undoubtedly may pass over the larynx or through the intestine without producing disease or may be carried by the blood- or lymph-stream in the same way, but, if held up in sufficient numbers to produce a lesion, it tends to spread by local extension. Persons in contact with an "open" case over a long period usually show local lesions, some arrested and some active. The more dilute the infection, the less chance of passing it on. Large rooms, open windows, ventilation and cleanliness lessen the risks and it is rare for one of the staff of a tuberculosis institution to contract the disease. Measles is known to decimate populations unused to it. Likewise, in countries where tuberculosis is unknown there is little resistance shown to it and the disease is acute and rapidly fatal. Nevertheless, many of such primitive populations will react to tuberculin and the reactors are generally more than less liable to disease than the nonreactors. *Comparative statistics:* It is interesting to find that the infantile tuberculosis death-rate for England and Wales, France and Holland, is practically the same, yet for adults of 20 to 24 years that of France is nearly twice as high as for England and Wales. Assuming the same proportion of infected infants survive, which is altogether likely, this appears to point to reinfection rather than recrudescence as a factor in the adults. There is every reason to believe that small repeated doses of tubercle bacilli, like alcohol, tobacco, or morphia, lead to tolerance, but do not inhibit activity and propagation. Among environmental factors, it is known that a prolonged shortage of fats in the dietary increases the incidence of tuberculosis. In conclusion 21 articles of faith, based on clinical and scientific knowledge of tuberculosis, are submitted.—*Reinfection in Tuberculosis, L. S. T. Burrell, Tubercle, January, 1935, xvi, 145.*—(*A. P.*)

Inoculated Guinea Pigs Treated with Acetone Extract of Tubercle Bacilli.—This report was made because the authenticity of the positive findings in guinea pigs inoculated with suspected materials and treated with the acetone extract of Koch's bacilli was questioned and attributed to faulty technique. The technique employed in these studies is described, and a statistical summary given along with the authors' conclusions of the three years' work. A total of 767 guinea pigs were observed. This includes inoculated, treated and control guinea pigs, and those used for successive passages. Rabbits and chickens were used for testing the virulence of the acid-fast organisms recovered. The atypical S variants which were tested were avirulent for the animals but did produce in the guinea pig a sensitization to tuberculin, thereby differentiating these organisms from the paratubercle bacilli. Out of the 644 guinea pigs inoculated and treated with the acetone extract, 91, or 14.2 per cent, were positive. Of the 123 control guinea pigs, that is, guinea pigs treated with extract and not inoculated, or inoculated with extracts known to contain tuberculous virus and not treated with the acetone extract, only 3, or 2.4 per cent, were positive, showing what might be termed spontaneous tuberculosis. Since the acetone extract is known to bring out a rare case of infection with acid-fast bacilli, this percentage of positive results in the controls would appear to play an insignificant rôle. Successive passages from guinea pig to guinea pig do not favor the appearance of tuberculous infections due to contamination, since only 12, or 5.8 per cent, were positive out of 205 guinea pigs of the second, third, fourth and fifth passages.—*Étude comparative du traitement à l'extrait acétonique de bacilles de Koch, sur des cobayes inoculés de produits suspects et sur des cobayes sains, J. Valtis and F. Van Deinse, Compt. Rend. Soc. Biol., February 16, 1935, cxviii, 652.*—(*M. T. W.*)

Adsorption of Antibodies.—Kaolin and carbon do not adsorb the antibodies of syphilitic and tuberculous sera. After the addition of ethyl alcohol to syphilitic sera the antibodies can be adsorbed to a considerable extent by kaolin. If to syphylitic sera is added kaolin which had previously been treated with the Wassermann antigen, the complement-fixing property of the serum is completely removed. Similarly, syphilitic or tuberculous sera can be deprived of their antibodies by the preliminary treatment of the sera with the homologous antigen followed by adsorption with kaolin or animal charcoal. In cases of sera derived from individuals suffering from syphilis and tuberculosis simultaneously, the antibody of each of these can be successively removed by the above procedure. The flocculating antibodies can also be adsorbed by a similar procedure.—*Ueber die Adsorption von Antikörpern aus Seren Syphilitischer und Tuberkulöser, B. D'Alessandro and F. Sofia,*

Ztschr. f. Immunitätsforsch., February, 1935, lxxxiv, 237.—(M. B. L.)

Vaccination *per os* of R and S Variants of *BCG*.—The efficacy of *BCG* vaccination by mouth over the parenteral method has long been a controversial point. The low grade and short duration of tuberculin sensitivity of the animal following a vaccination *per os* is explained by the rapid elimination of the bacilli in the faeces. R and S variants produce different types of reactions in laboratory animals. The S variant regularly produces the regressive type of lesion (so-called Yersin type), while the R variant rarely does. A series of experiments was made to determine the difference of the allergic reaction in guinea pigs vaccinated *per os* with both R and S variants of *BCG*. Two groups of 12 young guinea pigs each were given orally 300 mgm. of S and R strains of *BCG*. The growth-curve of the guinea pigs vaccinated with *BCG*, R variant, was normal, while the growth curve of those vaccinated with the S variant was definitely retarded during the four months following vaccination. After this period the growth curves were comparable in the two groups. Cultures of the faeces were made on both groups of vaccinated animals. During the first eight days the excretion of bacilli in the two groups was abundant. The R group ceased to eliminate acid-fast bacilli twelve days after vaccination. The S group continued to give positive faecal cultures intermittently up to five months after vaccination, thus indicating the presence of an open lesion in the gastrointestinal tract, a fact which was confirmed when one of the animals dead of a pneumococcal infection came to post-mortem seven months after vaccination. Tuberculin reactions in 4 guinea pigs of the R group became positive in twenty-eight days. These reactions all became negative after various prolonged periods. The 8 other animals of that group did not show positive tuberculin reactions even as late as a year after vaccination. At autopsy none of the animals showed tuberculous lesions. In the S group the guinea pigs showed weakly positive tuberculin reactions fourteen to twenty-eight days after vaccination, which became increasingly stronger to weaker dilutions of tuberculin. This group of animals also showed no tuberculous lesions at autopsy. These observations solve the question of the possibility of producing a lasting tuberculin sensitivity with the S variant of *BCG* given orally in place of the non-dissociated *BCG*, R strain.—*Elimination fécale des bacilles tuberculeux et allergie tuberculinique chez les cobayes inoculés per os avec les variétés R et S du BCG, K. Birkhaug, Compt. Rend. Soc. Biol., May 25, 1935, cxix, 370.—(M. T. W.)*

Hypochloraemia in Pulmonary Tuberculosis.—Pronounced hypochloraemia was observed in severe cases of pulmonary tuberculosis, and appeared to be proportionate to the severity of the disease. During improvement in the patients the serum-chloride content rose to normal values. Of 18 patients with severe pulmonary tuberculosis in the third stage, 11 had a serum-chloride content below 330 mgm. per cent, 4 had values between 330 and 350 mgm. per cent, and only 3 were above 350, in contrast to the normal value of 360 mgm. per cent. In 3 patients suffering with pulmonary tuberculosis complicated with tuberculous meningitis, the serum-chloride content in one was 333, and in the other two it was below 300 mgm. per cent. It could not be demonstrated that the hypochloraemia was due to decreased ingestion of sodium chloride, increased excretion or migration into the tissues, except possibly the muscles. In other tissues the figures were low. Injection of sodium chloride intravenously seemed to have some beneficial effect.—*Hypochloraemia in Pulmonary Tuberculosis, Gerda Seidelin, Acta. Tuberc. Scandinav., 1935, viii, fasc. 4, 265.—(F. B. S.)*

Blood Picture and Sedimentation Reaction in Pulmonary Tuberculosis.—In a series of 100 male patients with pulmonary tuberculosis a careful study was made of the blood picture and of the sedimentation reaction. All patients had open pulmonary tuberculosis with or without cavities, and they were clinically not very active or quiescent. All these patients had a practically normal sedimentation rate. The blood picture, however, was abnormal in all. In most patients there was a marked quantitative and qualitative deviation of all leucocytes. The total white count was normal or increased, never decreased. There was always a marked lymphocytosis, often combined with a shift to the left in the neutrophiles. In patients who had a normal neutrophilic picture there were always deviations in the lymphocytes. Normal absolute figures may coexist with open cavities. Only quantitatively and qualitatively normal blood pictures indicate complete arrest.—*Die Bedeutung des weissen Blutbildes im Verhältnis zur Blutkörperchensenkungsgeschwindigkeit bei der klinischen Beurteilung einzelner Formen der Lungentuberkulose, T. Thiele, Beitr. Klin. Tuberk., March, 1935, lxxxvi, 126.—(M. P.)*

Sodium Chloride in Sputum.—The excretion of sodium chloride is not the same in the various diseases of the respiratory tract. In cases of chronic bronchitis and of bronchiectasis the excretion is consistent with the amount of intake. For therapeutic purposes it has to be emphasized that patients with bronchiectasis should not be treated with a salt-deficient diet. A decrease in the amount of the sputum following the reduction of salt has not been found. Cases with pulmonary abscess showed definite reduction of sodium chloride in the sputum, which might be due to storage of the sodium chloride in the abscess. In cases of gangrene of the lung there is no variation of the sodium chloride from the normal. In pulmonary tuberculosis the excretion of sodium chloride shows some peculiarities. Cases with early cavities and with exudative forms, that is, acute progressive cases, had a relative increase in salt output in the sputum during periods of salt-deficient diet, and, following the administration of sodium chloride, they had a reduction of sodium chloride in the sputum. Cirrhotic and productive cases showed generally a direct relation between the administered and the excreted amount. It is not possible to state a definite relationship between the pathologicoanatomical lesions and the content of sodium chloride in the sputum. Cases of exudative character, treated with artificial pneumothorax, showed no retention of sodium chloride following the administration of salt. Therefore an indirect influence of artificial pneumothorax on the composition of the sputum seems to exist. In cases of retention of sodium chloride following the administration of sodium chloride, the diet of Sauerbruch-Hermannsdorfer might have a curative effect.—*Die Bedeutung der Kochsalzbestimmung im Sputum, O. Zorn, Ztschr. f. Tuberk., May, 1935, lxxiii, 21.*—(*F. G. K.*)

Hypertension and Active Tuberculosis.—Clinical experience indicates that arteriolar hypertension and active tuberculosis do not commonly occur together. In this study no reason for this uncommonness is found. Of 212 tuberculous patients 39 per cent were over 40 and 13 per cent over 50 years, yet none had hypertension. The incidence of pleurisy, past and family histories of tuberculosis was similar in 190 ward patients with essential hypertension and in 101 ward patients (over 45 years of age) with normal blood-pressure. The postmortem records of 80 hypertensive patients who died of nontuberculous diseases revealed that 46 had old fibrous adhesions over the upper lobe, usually at the apices and often in both lungs, that 19 had grossly calcified areas in the lung parenchyma, and that 6 had microscopical evidence of tuberculosis of the lymph nodes in hilum and mesentery. A group of 40 ward hypertensive patients, average age 58, and a group of 55 ward nonhypertensive patients, average age 50, received injections of four dilutions of intracutaneous tuberculin at one time. The reactions were similar in the two groups; to the 1 to 1000 dilution, 90 per cent of the hypertensives and 91 per cent of the controls reacted, and to the 1 to 100,000 dilution, 30 per cent and 26 per cent, respectively reacted.—*Arteriolar Essential Hypertension and Active Tuberculosis: Their Rare Association, D. Ayman, Am. J. M. Sc., November, 1934, clxxviii, 712.*—(*E. M. J.*)

Diagnosis of Early Tuberculosis.—What is the "early case?" Picture a girl whose face recalls an Elizabethan love lyric and whose age is "sweet and twenty," who complains of a cough of two or three weeks duration, blood-spitting and lassitude. Physical signs in the chest are not helpful, but the sputum shows typically staining acid-fast bacilli. Skiagrams show the appearance of a rarefied area (cavity) the size of a shilling surrounded by a diffuse haze or fluffy mottling. On closer inspection, there may appear a dense opacity the size of a millet-seed near the periphery of the right lower lobe, representing a calcified tubercle. The evidence indicates that there has been a primary infection in childhood, which has been overcome, and a later reinfection. What has happened in the interval? The problem may become simpler when infection is less prevalent, and childhood exposure to infection is no longer permitted. The processes of infection, haematogenous dissemination with such manifestations as erythema nodosum and pleural effusion—"acute benign tuberculosis"—and then the localized development recognized as phthisis, are seriatim events separated by intervals in which nothing appears to happen. In fact, the majority of infections whether occurring in a hospital ward or an African gold mine are not followed by recognizable tuberculosis. At present all we can hope for is to detect the disease at a stage when the lung tissues show the first signs of disintegration. Early disease is not necessarily a limited disease. Moreover, it is important to detect early recrudescences of old lesions. *Classification of types:* Two main groups are recognized, (1) proliferative and (2) exudative. The first type is ordinarily chronic, though marked by exudation at its onset, subsequently followed by caseation and fibrosis. Postmortem shows examples of this type and the pathological text-book plates depict it.

Cavity walls are irregular and unyielding, and fibrous strands of tissue are prominent. It is seen especially in middle age, but also in childhood, adolescence and early adult life. Our knowledge of the exudative types is less far-reaching and is more largely roentgenographic. The most noteworthy feature, typical of adolescent phthisis, is the tendency to parenchymal exudation and the formation of soft-walled cavities, sometimes exactly circular and of very rapid development. They are still sometimes incorrectly termed "annular shadows," being in fact spherical, as can be demonstrated by lateral or oblique views. The hypothesis of small localized pneumothoraces is still more unsupported by the facts. So long as they remain, tubercle bacilli persist in the sputum, and disappear with their closure, whether naturally or by collapse therapy. The terms "elastic" or "silent" cavities refer to their evanescence and lack of demonstrability by physical signs. In fact this form of phthisis in general is characterized by absence of abnormal physical signs. Why text-book writers and teachers and demonstrators generally are so unwilling to recognize this is a problem. In the days before the general availability of the X-rays we were taught that physical examination reveals only about 25 per cent of the disease actually present. The student should have it emphasized that pulmonary tuberculosis is a relatively silent disease, thus being different from other chronic chest maladies. However, the type that gives no signs usually betrays itself by symptoms and both types shed tubercle bacilli, often on the first examination. If the patient swallows the sputum, examine the faeces. As to symptomatology: of 50 young cases seen at Victoria Park Hospital, London, 23 gave a haemoptysic history and about one-half a history of close family contact with infection. Fourteen complained of cough with sputum. Suggestive physical signs were noted in only one-half. The old term "tuberculous diathesis" has some merit. The patient who looks the part is more likely to be tuberculous than he who does not, especially among the young, less so after middle life. In contrast with the plaintive whine of the sympathy-seeking patient, there is usually a tendency to minimize symptoms or admit them reluctantly. This is especially true of haemoptysis, which is attributed to other causes nonchalantly. This may be termed the "ostrich complex." The patient's appearance is often suggestive, especially bright eyes and a smooth delicate complexion, which may persist into middle life. As for symptoms and signs, enfeebled breath-sounds may occur over early infiltration, and fine moist râles, heard best over the inspiratory phase following a short cough, and especially over an apex or subapex, are almost diagnostic when present, which is rarely. *Conclusion:* Roentgenographic technique and interpretation are stressed as of first importance. Miliary stippling may occur in tuberculosis, pneumonoconiosis and carcinomatosis, and more than one of these conditions may exist at the same time.—*The Diagnosis of Early Pulmonary Tuberculosis, W. B. Wood, British M. J., February 16, 1935, no. 3867, 294.*—(*A. P.*)

X-Ray Interpretation.—The end-result of the healing manifestations in pulmonary tuberculosis, demonstrable on the roentgen film, permits of a division of lesions into five types. The exudative lesion terminates in one of three ways: (1) It may completely resolve and leave no traces in the roentgenogram, (2) it may resolve and leave a residual of a few fibrotic strands, or (3) it may undergo caseation and cavity formation. The productive lesions present themselves in one of two forms: (1) fibrotic strands with small nodules, and (2) fibrosis with numerous small cavitations resembling a bronchiectasis. From a clinical standpoint, with the aid of the roentgen study, all cases of pulmonary tuberculosis can be divided into two groups: One group has practically no mortality rate and can be considered benign; the other has a high mortality rate and should be considered malignant. The benign lesions run mild clinical courses. Their prognosis is good and requires no active intervention, such as collapse therapy measures. The malignant lesions usually run a stormy course, often metastasize and spread. These are the only types that compel the use of collapse therapy measures. Mutations observed in serial roentgenograms reveal whether a lesion is benign or malignant. This information aids in determining prognosis and treatment.—*Interpretation of Roentgenograms in Pulmonary Tuberculosis, H. K. Taylor, J. Am. M. Ass., March 16, 1935, civ, 898.*—(*G. L. L.*)

Roentgenology of Giant Cavities.—In 5 cases of giant cavities, presenting roentgenologically a maximum diameter up to 10 cm., artificial pneumothorax yielded quite satisfactory results. These cavities were visualized in both sagittal and lateral views. The roentgenological appearance is sometimes misleading in regard to the apparent size of the cavity, and the presence of adhesive pleural thickening, since pneumothorax treatment shows decrease in size and satisfactory collapse of the involved lobe. In

spite of pleural and interlobar fixation of the parenchymal and corticopleural zones in the area adjacent to the cavity, the degree of collapse obtained by a pneumothorax can be satisfactory and a sufficient and gradual freeing of the adhesive strands is obtained. In order to decrease the size of the cavity the manometric pressure must sometimes be elevated above the atmospheric pressure. Good results were shown also in cases of bilateral active tuberculosis.—*À propos de l'examen radiologique des cavernes géantes et de leur traitement par le pneumothorax, P. Pruvost, Brincourt, Livieratos and M. Leblanc, Arch. Méd. Chir. de l'App. Resp., 1935, x, 15.—(F. G. K.)*

Lipiodol in Bronchography.—With its secreting mucous membrane lining and the cough reflex, the bronchial tissue can tolerate lipiodol injections well. However, the alveoli probably show a fibrinous reaction, as has been found when iodized oil is injected into the pleura, pericardium, peritoneum, and joint spaces. The simple epithelial lining of the alveoli is not very effective in absorbing this fatty material and the removal is largely by phagocytosis and lymphatic drainage through the hilar lymph nodes. After a period of months a normal lung injected with lipiodol may show roentgenographic findings similar to extensive tuberculous infiltration. In view of this slow absorption and probable scattered obliterative alveolitis, it is best to be conservative in the amount of lipiodol injected and the extent of the pulmonary area investigated. Immediately on injection, lipiodol acts as a plastic foreign body obstructing the bronchioles (dead-tree effect). Then, as the entrapped alveolar air is absorbed by the circulating blood it is replaced by the iodized oil (tree-in-full-season effect). Unless absolutely necessary, only cocainization of the larynx should be done, since anaesthesia of the bronchial mucosa abolishes the cough reflex and relaxes the tone of the bronchioles, thus causing larger reservoirs of oil there with resulting drowning of the lung on absorption of the alveolar air. This complete filling of the alveoli and terminal bronchi obscures the finer lung markings, giving false evidence of pathological change, such as lung abscess. Of the various methods of injection, the supraglottic is most simple and easy. This maps out the bases satisfactorily. Since the cricothyroid method is not devoid of danger and does not aid in selective mapping it should rarely be used and then only a needle which conforms to the contour of a tracheotomy tube should be employed. The intratracheal catheter method permits roentgenoscopic observation during the injection of the oil, and, by rotating the catheter, makes possible selective mapping. When investigating large areas of atelectasis the bronchoscopic method may be invaluable. Direct manual insertion of the catheter in the trachea by the sense of touch may also be done. In children the best method (when it works) is the small calibre Coudé catheter passed through the nose into the larynx. A simple method is instillation of the oil into the nostrils and obtaining selective mapping by position of the child. During natural sleep or that induced by avertin a tube may be passed into the posterior nares. While it does not permit of any particular localization of the oil, lipiodol injection through a specially constructed incubation tube, recommended by Iglauer, often proves the best method.—*Practical Observations on the Use of Iodized Oil in Bronchography, L. R. Sante, Am. J. Roentgenol., December, 1934, xxxii, 763.—(E. M. J.)*

Iodism and Death after Lipiodol Bronchography.—The use of lipiodol for bronchography has now become so much a part of the routine investigation of non-tuberculous chest diseases that the occurrence of any severe complication appears worthy of record. Several previous cases of severe iodism have been described in British and Canadian literature in connection with this procedure, including one death. The two cases here described, one of which proved fatal, occurred at the Brompton Hospital, London. Prior to this over 2,900 lipiodol examinations had been performed without serious accident, although mild and transitory cutaneous and mucomembranous manifestations had not been infrequent. Constitutional symptoms were rare. *Case 1*, a man of 46, was referred from a tuberculosis sanatorium because of question as to the original diagnosis, being thought to have either a chronic lung abscess or neoplasm, and the general condition was poor. Six hours after a satisfactory introduction of 20 cc. of lipiodol by the subcricoid route, with X-ray film showing good outline of the bronchi and probable bronchiectatic abscess of the right upper lobe, he developed marked coryza, epistaxis, salivation and conjunctival injection; later, weakness, failing pulse and petechial haemorrhages and oedema of tongue and conjunctivae, with swollen submaxillary lymph nodes. The following day all symptoms increased, there were subcutaneous haemorrhages, dyspnoea and signs of pulmonary oedema, also dysphagia. Death occurred in fifty-four hours from exhaustion and pulmonary oedema. Treatment, which included local injection of epinephrin in the tongue, atropine and

sodium thiosulphate intravenously was ineffective. Postmortem examination showed congestion and oedema of the respiratory tract; also intestinal mucous haemorrhages and congestion, and cloudy swelling of the kidneys. Haemorrhages had also occurred into the visceral pericardium. *Case 2*, a woman of 59, who had been attending the hospital several years, had previously (1930) had a lipiodol examination showing bilateral basal cylindrical bronchiectasis and had been treated with potassium iodide. On this particular occasion (June 29, 1934) she received 20 cc. of lipiodol by the cricothyroid route, returning home, and her X-ray showed advanced bilateral bronchiectasis. The evening of the following day she was admitted with an urticarial rash, purpuric patches over both olecranons and below the knees, painful swelling of both forearms and oedema of the face with purpuric patches. The chest was full of bubbling râles and rhonchi, and there was dysphagia. Symptoms at first increased. An intravenous injection of 25 ounces of hypertonic (1.8 per cent) saline solution with 5 per cent glucose was given and followed by improvement but the patient was confined to bed four weeks. *Discussion:* The symptoms were definitely those of iodine sensitivity in both cases and the poppy-seed oil component can be eliminated; also the question of impurities because this same batch of lipiodol had been given to others with no ill effects. Sicard and Forestier have found that the rate of lipiodol absorption from the bronchi is not far below that when given by mouth. Previous testing for sensitivity with potassium iodide is of little value. The use of hypertonic saline solution intravenously is theoretically rational and practically useful in combating the oedema and depletion of blood volume.—*Acute Iodism Following Lipiodol Bronchography, J. G. Scadding, Brit. M. J., December 22, 1934, no. 3859, 1147.*—(*A. P.*)

Auscultation of Pulmonary Cavities.—Auscultation alone is far from accurate in the diagnosis and study of tuberculous pulmonary cavities. In 296 cases of pulmonary tuberculosis with cavity and with tubercle bacilli in the sputum, 464 cavities were estimated from roentgenograms. All patients were examined once a month, and stereoscopic roentgen ray films were taken on an average of every two months. Patients with "silent cavities" were reëxamined after the roentgenograms were seen. Particular attention was given to the site and character of râles. Cavity was diagnosed by physical examination in 40 per cent of the 296 cases. This figure refers to cavity-bearing areas containing either single or multiple cavities. In a separate study of 170 cases with solitary cavity, a diagnosis of cavity was made in only 31 per cent. Here size was a factor, as the percentage of positive diagnoses increased from 21 per cent for cavities of dimensions not over 2 by 2 cm. to 53 per cent for cavities over 4 by 4 cm. Also, thin-walled, fresh cavities were more easily missed than those with fibrous walls or surrounding consolidation. To correlate changes in râles and roentgenographic findings, two contrasting groups were examined. In the first group were 65 cases that secured spontaneous closure of cavities, the criteria for which were disappearance of cavity in serial roentgenograms, and absence of tubercle bacilli from the previously positive sputum for at least three consecutive months. The second group comprised 84 cases in which the size of cavities at the end of treatment was the same or larger. In the first group râles were unaltered after closure in 30.8 per cent, diminished in 67.7 per cent, and increased in 1.5 per cent. Of the second group, râles were increased in 40.4 per cent, unchanged in 47.6 per cent, and diminished in 11.9 per cent. Consequently, estimation of changes in cavities deduced from variations in râles is unreliable. Roentgen-ray interpretation, on the other hand, is not infallible. Many intrapulmonary lesions cast shadows indistinguishable from tuberculosis, and small tuberculous lesions cannot be clearly shown, especially if the roentgen-ray technique is not the best. Furthermore, such conditions as pleural friction, pulmonary oedema, bronchitis, and sometimes emphysema, can be more readily detected by auscultation than by roentgen-ray. Treating tuberculosis on the basis of roentgen-ray alone overlooks the importance of other clinical features and of personality as a guide to treatment and prognosis. For this purpose, a well-taken history and careful physical examination are indispensable. If reliance had been placed on auscultation alone in this series of 296 cases of tuberculosis with cavity only one-half of the large cavities diagnosable by roentgen-ray would have been detected, and four-fifths of the smaller ones would have been missed. In practice, it is therefore wise to withhold final opinion on the presence or size of cavity until the roentgen film has been read. Roentgen film and fluoroscopic examinations at intervals of weeks or months are the best means for observing the behavior of cavities as to size and character. For this purpose deductions made from changes in extent, character, and number of râles are unreliable, since râles may increase or remain the same as the disease heals, or may diminish as the disease grows worse. Recognition of

these limitations emphasizes the need for correlation of physical, roentgen ray, and laboratory examinations.—*Limitations of Auscultation for the Diagnosis and Study of Tuberculous Pulmonary Cavities, B. T. McMahon and E. H. Kerper, Am. Jour. M. Sc., November, 1934, clxxxviii, 697.—(E. M. J.)*

Method of Sputum Digestion.—In order to preserve the viability of tubercle bacilli and at the same time kill off extraneous organisms a method for digesting biological specimens is given. Ten cubic centimetres of sputum is placed in a 50-cc. centrifuge tube, to which is added 20 cc. of a one per cent hydrochloric acid and 100 mgm. pepsin. This is shaken fifteen minutes and put in the incubator for twelve hours, and then neutralized to litmus with normal sodium hydroxide and centrifugated for one hour. The sediment is used for inoculating tubes and plates. This method reduces the danger of killing the tubercle bacilli to a minimum.—*A Method of Sputum Digestion Preliminary to Culture for Tubercle Bacilli, W. L. McNamara and E. F. Doucey, Jour. Lab. & Clin. Med., June, 1935, xx, 976.—(M. T. W.)*

Tubercle Bacilli in Faeces.—In 60 cases of tuberculosis of children and adults the examination of faeces showed a positive result only in 12 cases of adults, and in none of the cases of children. The latter showed in half of the cases tubercle bacilli in the gastric contents. It is concluded that the examination of the faeces is far inferior to the examination of the gastric lavage.—*Tuberkelbazillennachweis im Stuhl in Vergleich mit Auswurf- und Magenspülwasseruntersuchung, E. Piasezka-Zeyland and W. Sznajder, Ztschr. f. Tuberk., March, 1935, lxxii, 277.—(F. G. K.)*

Blood Picture in Tuberculosis.—In 150 cases of various forms of tuberculosis treated in the Basler Heilstätte, in Davos the following observations were made: The red blood picture is of some significance in cases of intestinal tuberculosis associated with hypochromic anaemia and with toxic symptomatology. It facilitates sometimes the differential diagnosis between tuberculosis and pernicious anaemia or carcinoma. It is emphasized that in patients with pernicious anaemia, tuberculosis is rarely found. The total white count is of no significance for the diagnosis of tuberculosis. Sometimes it facilitates the differentiation from intercurrent complications (appendicitis). The qualitative examination of the neutrophilic leucocytes affords definite help for the diagnosis of tuberculosis. There is left-deviation in 90 per cent of patients with active tuberculosis, while this deviation is rarely found in inactive cases. In early stages the reaction is seldom of high degree, but it increases in cases showing beginning tissue destruction. A high-grade left-deviation indicates an unfavorable prognosis. There are exceptions in cases treated with artificial pneumothorax. An increase of eosinophilic leucocytes is a sign of a high grade allergic stage, and may anticipate an improvement (biologically a desensitization) or a deterioration (biologically a loss of sensitivity). Basophilic leucocytes are of no value for the diagnosis of tuberculosis. Lymphopoenia indicates progressive disease. High-grade and moderate lymphocytosis are a favorable sign only if they occur following a period of lymphopoenia; this means a tendency toward a phase of latency. Increasing lymphopoenia is an unfavorable sign. Monocytosis occurs often in serious cases, and represents, together with a left-deviation, activity of the lesion. It is mostly seen during the defensive phase. Monocytes have to be considered in relation to leucocytes and lymphocytes. The toxic changes of leucocytes are more often seen in progressive exudative lesions than in productive forms. Their occurrence in intestinal tuberculosis seems to be the rule. The number of thrombocytes is increased more in exudative than in productive tuberculosis. In far-advanced cases the number of the thrombocytes is small; no prognostic value attaches to the examination of thrombocytes. The combination of the tuberculin test and the blood picture is valuable. The examination of the local blood picture in the Pirquet papule is of no help in determining the secondary or tertiary state of Ranke. Lymphocytosis in the local blood picture is rather a favorable symptom, indicating a healing tendency than an evidence of "secondary allergy." The blood picture in tuberculosis is of valuable help only in corroboration with other clinical methods.—*Das Blutbild der Tuberkulose, J. Leitner, Ztschr. f. Tuberk., May, 1935, lxxii, 343.—(F. G. K.)*

Leucocytes in Tuberculosis.—While the blood count does not perform the function of a diagnostic test in tuberculosis, the supravital study of the white cells of ambulatory children with positive tuberculin reactions supplies information of a more precise nature as to the status of the pathological process than can be obtained from the complaints of the patient, the physical examination, or the roentgenogram. This is especially true in younger children, probably because of the greater cellular lability

early in life and the tendency for tuberculosis to run a more acute course during this period. It is during the first year of life that the monocytic changes and the monocyte-lymphocyte index of the peripheral blood can be applied to greatest advantage as a guide to the status of the tissue lesion. Search for other evidence of manifest tuberculous disease is justified when repeated examinations of the blood show 14 per cent or more of monocytes and a percentage of lymphocytes to yield a monocyte-lymphocyte ratio of 0.5 or more. When the blood examination, in addition, reveals a slight leucocytosis and a rise of polymorphonuclear neutrophiles, together with a decrease in eosinophiles, the blood picture of activity is strengthened. The cellular percentages, however, are only suggestive, and must be considered in relation to age and as only a part of the entire clinical picture. Unusually high monocyte counts are noted in some children with positive tuberculin reactions during the course of non-specific infections such as pneumonia. —*Evaluation of the White Blood Cell Picture in Ambulatory Children with Positive Tuberculin Reactions: Supravital Studies, C. H. Smith, Am. J. Dis. Child., February, 1935, xlix, 327.*—(*M. D.*)

Isolation of Tubercle Bacilli.—Lubenau's egg medium and the egg-potato medium of Winogradow were compared for their value in isolating tubercle bacilli, especially from cold abscesses. Material obtained at operation, as well as urine and cerebrospinal fluid, was first treated with 10 per cent sulphuric acid, as in the Löwenstein-Hohn method, and was then planted on these two media. The egg-potato medium of Winogradow is prepared by adding twice the volume of water to thin slices of potato, filtering through gauze, and adding sufficient glycerol to make a concentration of 5 per cent. After sterilizing at a pressure of 2 atmospheres for 20 minutes, one part of the potato extract is added to 2 parts of well-beaten eggs. The medium, which should have a reaction of pH 5.8–6.0, is tubed and sterilized for two successive days at 85°C. for 45 minutes. The author found that, while cultures of tubercle bacilli were obtained with equal frequency on both media, on the Winogradow egg-potato medium, colonies appeared one to 15 days earlier, and that the colonies grew more rapidly and more luxuriantly.—*Zur bakteriologischen Diagnose der Tuberkulose, Marie Walcker, Zentralbl. f. Bakt., April, 1935, cxxxiv, 99.*—(*J. D. A.*)

Demonstration of Tubercle Bacillus.—In the examination of 500 specimens of different kinds, the tubercle bacillus was found 166 times, using direct smears, guinea pig inoculation, and cultures. In 40 positive sputa, it was found 8 times by the examination of smears, 39 times by culture, and 32 times by guinea-pig inoculation. In 16 positive specimens of gastric contents, the direct smear discovered the bacillus in 6 cases, and missed it in 10; the culture was positive in all of them; the inoculation helped in 12, and on four occasions both of the animals injected died before 20 days. In 12 positive specimens of pus from abscesses, the direct smear missed the bacillus in 9, and revealed it in only 3 cases; the culture and the inoculation were positive in all. Pleural fluid was positive in 21 cases. Direct smear missed the bacillus in 17 cases, culture in 2, and inoculation in 4; 55 specimens of urine were positive, 36 by direct smear, and all by culture and inoculation; 16 spinal fluids were positive, 12 by direct smear, 16 by culture and 12 by inoculation. A specimen of bone was positive by culture and negative by direct smear. The animals died before 20 days, without lesions. One specimen of fluid from a joint was negative by direct smear, and positive both by culture and by guinea-pig inoculation. In three lymph-node specimens, the culture and inoculation were positive in all, and the direct smear in one. A specimen of semen was positive by culture and inoculation, and negative by direct smear. *Summarizing:* Of 166 positive specimens, direct smear revealed the bacillus in 70, and missed it in 96 cases; cultures helped in 163 cases, missing in only 3, while inoculations were positive in 146, negative in 7, and in 13 results were inconclusive (animals died before time). The examination of direct smears is a poor method of searching for the tubercle bacillus, since it failed in 96 out of 166 specimens. Its only advantage is its rapidity, which is worth while, taking into consideration only processes like meningitis, where one cannot wait for the inoculation before making a diagnosis. This advantage, however, is only relative, since it may happen, when only the direct smear is examined, that any type of *mycobacterium* be mistaken for the tubercle bacillus. This did happen in one case, in which tuberculous meningitis was diagnosed by the finding of large numbers of acid-fast bacilli in the spinal fluid. It is to be wondered whether some of the reported cases of tuberculous meningitis with recovery are not of the same nature. It is thought ordinarily that the pseudotubercle bacillus of the genus *Mycobacterium* is easily cultured, and its failure to grow in ordinary media might be taken as proof that the germ in question is the tubercle bacillus. In 30 specimens of

smegma from healthy subjects, chosen because of the abundance of acid-fast bacilli by examination of the direct smear, not once was it possible to obtain a culture by the most varied methods, whether or not the specimen was previously treated with sodium hydroxide or sulphuric acid. Most authors agree that the smegma bacillus is less acid-fast than the tubercle bacillus, and that it is not alcohol- or alkali-fast. There are 3 types of smegma bacilli which differ in acid-fastness. The first one is weakly acid-fast; it is neither alcohol- nor alkali-fast, grows easily, and in cultures shows only acid-fastness in the protoplasm, which appears blue. It is apparently a *corynebacterium* of sharp extremes and gram-positive. The second one is less acid-fast than the former, but it is neither alcohol- nor alkali-fast; it is short, thick, with rounded extremities; and the third one is long, with fine extremities, and strongly alcohol- and alkali-fast. The authors have never been able to culture these last two. While it is easy to distinguish the first two bacilli from the tubercle bacillus by their staining qualities, it is not so with the last one. The guinea-pig inoculation method of investigating tubercle bacilli, although valuable, is not as sensitive as it is generally believed. The phrase attributed by Löwenstein to Robert Koch in 1910, "We must create a method that will allow us to do away with the guinea pig, for this is a filter that retains many things," appears justifiable. In practice, one possible cause of error is in the minute abscesses that develop, almost always in the lymph nodes, and that are easily missed unless a very careful autopsy is made. In some cases these abscesses were no bigger than a pin-head, and yet they were true tuberculous lesions, as revealed later by culture and reinoculation. Undoubtedly, acid-fast bacilli will at times be found in the organs of apparently healthy guinea pigs. This is a possible cause of error in inoculation. In direct smear examinations, as well as in cultures and apparently normal lymph nodes of inoculated guinea pigs, the authors found, with relative frequency, acid-fast germs of an unknown nature, which do not develop in culture media and which do not cause any tuberculous lesions in the guinea pig. In one of the cases, a nontuberculous mycobacterium was isolated. Following closely Löwenstein's technique, the authors have made nearly 300 blood cultures for the tubercle bacillus, with blood from pulmonary and renal cases of tuberculosis, some miliary cases, and also from acute articular rheumatism, erythema nodosum, and dementia praecox, and from the spinal fluid of cases of this last disease. In not a single case was it possible to obtain a positive culture. This failure may be due to some detail of technique of capital importance which Löwenstein himself has overlooked. The fault was not in the preparation of the culture medium, since good results were obtained with it when other specimens were used.—*Comparación de los métodos de investigación de mycobacterium tuberculosis para el diagnóstico de la tuberculosis en el hombre, E. Hormaeche, F. Huges and C. H. Ledesma, Arch. Uruguayos Med., Cir. y Especialidades, August, 1934, v, 185.*—(*J. R. P.*)

Blood Cultures for Tubercle Bacilli using Whole Blood.—In the course of studies it was found that both bovine and human strains of tubercle bacilli grew abundantly and rapidly on Bordet-Gengou medium. One point which Löwenstein stresses in his work on blood cultures for tubercle bacilli is the necessity for completely removing the haemoglobin, believing it to inhibit the growth of the bacilli. In view of the fact that tubercle bacilli were found to grow on a medium containing a large amount of haemoglobin, a series of blood cultures for tubercle bacilli was made, comparing the two media. Ninety-eight specimens of blood from 63 tuberculosis patients and two specimens from a case of actino-mycosis were cultured. The specimens were equally divided, one part was cultured on Löwenstein's medium, employing his technique, the other part was planted on Petri plates of Bordet-Gengou medium and Löwenstein's congo-red-egg medium. Tubercle bacilli were found in 4 of the 46 cases of advanced tuberculosis, two of whom died shortly after the cultures were made. All the other cultures gave negative results. In two instances saprophytic acid fast organisms were found. Whole blood gave better results than Löwenstein's method. There were 3 macroscopically positive blood cultures on whole blood and only two on Löwenstein cultures. One Löwenstein culture showed a few acid-fast organisms on the scrappings which did not tuberculinize a guinea pig nor grow out on subculture. The use of plates is recommended instead of tubes.—*A Study of the Comparative Value of the Löwenstein Method and the Direct Culture of Whole Blood in Detecting Tubercle Bacilli in the Blood Stream, L. Mishulow, M. Siegel, B. Singer and M. Romono, Jour. Lab. & Clin. Med., July, 1935, xx, 1063.*—(*M. T. W.*)

Demonstration of Tubercle Bacilli in Blood.—To facilitate the isolation of tubercle bacilli from the blood Kovács suggests

modifying Löwenstein's method by employing animal charcoal as an absorbent. The centrifugalized erythrocytes are haemolyzed and the bacilli adsorbed by treating the blood for 15 minutes at room temperature with three parts of 0.2 per cent solution of saponin containing 0.75 per cent of dried sterilized animal charcoal. The cells are then centrifugalized for 20 minutes and the supernantant fluid removed under sterile conditions. The sediment is washed twice with sterile distilled water and suspended in 2 cc. of water. This suspension is then inoculated on each of 2 tubes of Löwenstein's red medium and on each of 2 tubes of Löwenstein's green medium. The author believes that the blood contains a water-soluble substance which inhibits the growth of tubercle bacilli.—*Beiträge zum Tuberkelbazillennachweis im Blut, N. Kovács, Zentralb. f. Bakt., June, 1935, cxxxiv, 255.—(J. D. A.)*

Normal Sedimentation Rate in Tuberculosis.—Out of 256 patients with bacilliferous pulmonary tuberculosis, 49 had a sedimentation rate of 10 mm. or less. Of these, 36 cases had productive cirrhotic lesions, and 10 exudative lesions. Thirty-one of these patients had roentgenologically demonstrable cavities.—*Normale oder annähernd normale Blutkörperchensenkungsreaktion und positiver Bacillenbefund bei Tuberkulösen, P. M. Kjelland, Beitr. Klin. Tuberk., April, 1935, lxxxvi, 196.—(M. P.)*

Complement-Fixation Methods of Measuring Antibodies.—In the sera of tuberculosis patients substances can be demonstrated by means of the complement-fixation reaction according to Witebsky, Klingenstein and Kuhn (W. K. K.), by Blumenthal's method and by that of Neuberg and Klopstock, which bear no relationship to the physical liability or the Wassermann reaction of the serum, nor to the allergic state of the individual, but which indicate the activity and extent of the tuberculous process. The author considers this reaction, which is most sensitive and specific when performed according to the W. K. K. method, as in the nature of an antigen-antibody reaction of group specificity. The W. K. K. antigen cannot be used to differentiate virulent tubercle bacilli from acid-fast saprophytes. Thoroughly washed virulent tubercle bacilli adsorb more reagins reacting with the W. K. K. antigen from tuberculous sera than other acid-fast bacteria. By the treatment of animals with tubercle and timothy bacilli, or their extracts, substances appear in the sera which react well with W. K. K. antigen. These substances can be more completely adsorbed from their sera by tubercle and timothy bacilli when filtrates of bacilli grown on Sauton's media are used for immunization than when the bacteria themselves are used for this purpose.—*Beiträge zur Kenntnis der tuberkulosen Antigen-Funktionen. I. Ueber die Methoden der Komplementbindung zur Antikörper-Messung des Tuberkuloseserums, Yoshio Aoki, Ztschr. f. Immunitätsforsch., May, 1935, lxxxv, 21.—(M. B. L.)*

Meinicke Reaction in Tuberculosis.—In 239 cases of pulmonary, and in 14 cases of extrapulmonary tuberculosis, the serum reaction of Meinicke (Klin. Wchnschr., 1934, xiii, 258) was proved to possess the same sensitivity and specificity as the usual methods of complement-fixation. The nonspecific reactions are only slightly positive, while with complement-fixation reactions in normals are at times strongly positive. The Meinicke reaction, in its strong and medium degrees, can be considered as true evidence of an active tuberculosis. The method is not reliable for serial and contact examinations because many acute and mild cases have a negative reaction. The reaction was positive in 6 of 16 nurses of the tuberculosis department; these reactions are evaluated as contact reactions. In 8 per cent of 240 examinations of nontuberculous persons the reaction was slightly positive; seven of these cases were probably due to contact with tuberculosis patients. The result of the reaction may be of high value in cases of extrapulmonary tuberculosis.—*Unsere Erfahrungen mit der Serumreaktion auf Tuberkulose von Meinicke, K. Zech, Ztschr. f. Tuberk., May, 1935, lxxiii, 1.—(F. G. K.)*

Meinicke Reaction in Tuberculosis.—The Meinicke reaction as described in 1934, was compared with other serological methods in tuberculosis. Of 111 patients with tuberculosis, 76.5 per cent had positive reactions; and, of 50 nontuberculous persons, 6 per cent had positive reactions. From these studies it would appear that the Meinicke reaction is at least as reliable as complement-fixation. A definitely positive reaction is strong evidence of an active tuberculosis.—*Zur Kenntnis der Meinickeschen Serumreaktion auf Tuberkulose, F. Böhm and G. Grüner, Beitr. Klin. Tuberk., February, 1935, lxxxvi, 4.—(M. P.)*

Phytotoxic Index in Pulmonary Tuberculosis.—The phytotoxic index, according to Macht, was determined in 100 patients with pulmonary tuberculosis in a total number of 220 tests. This index is not

specifically diagnostic for tuberculosis, but it has a definite prognostic value, the normal index being 76; in patients with clinically benign tuberculosis, it was found to be 42 to 76. During active progression the index increases to 80 to 100, and, in the preagonal phase, it may reach to above 100. The phytotoxic index is in direct correlation with the severity of the disease. All patients, who had an index of 100 or more, either died or are in a critical condition. Tuberculin prevents the growth of roots in proportion to its concentration.—*Der Wert des sogenannten phytotoxischen Indexes bei der Lungentuberkulose, J. L. Garcia and Garcia-Miñon, Beitr. Klin. Tuberk., February, 1935, lxxxvi, 45.*—(*M. P.*)

Effect of Hyperthermia on Cutaneous Tuberculin Reactions.—Twenty patients, all allergic, and suffering for the most part from nervous or rheumatoid diseases, were used to determine the influence of fever on tuberculin reactions. An initial cutaneous tuberculin test was made on one day. On the following day cutaneous tests were made in series, before, after and during intravenous injections of a vaccine (*vaccin antichancrelleux*). It was possible to obtain in man an experimental tuberculin cutaneous anergy by inducing artificial fever. This anergy was transitory, dependent on the hyperthermia and not on the specificity of the antigen injected into the circulation. The injection of the vaccine produced in no instance an anergy to tuberculin when the temperature of the patient was not influenced. These observations may explain tuberculin reactions seen in the course of infectious febrile diseases with cutaneous anergy.—*Influence de la fièvre provoquée sur l'allergie cutanée tuberculinique chez l'homme, C. Gernez and C. Marchandise, Compt. Rend. Soc. Biol., January 14, 1935, cxviii, 462.*—(*M. T. W.*)

Examination of Milk and Colostrum of Tuberculous Women.—Thirty-three samples of milk and ten samples of colostrum from tuberculous women with localized pulmonary tuberculosis were examined for the presence of tubercle bacilli. All specimens were examined microscopically, culturally and by the inoculation of two guinea pigs per each sample. In one of the 10 samples of colostrum a few acid-fast bacilli were found on microscopical examination. But, in view of the negative findings of this sample in both of the guinea pigs and the culture tubes, it was thought that these organisms came from a contamination of the test-tube, despite the careful technique and sterile glassware employed. All other tests on the samples of colostrum were entirely negative for tubercle bacilli. In 10 samples of milk collected from the third to the sixth days of the accouchement, all the examinations were entirely negative. A third experiment comprised samples of milk collected from the third to the sixth days after the accouchement. The examinations were completely negative microscopically and culturally. With one exception the guinea pigs were all negative. This one guinea pig killed five and one half months after inoculation revealed no tuberculous lesions at autopsy, but the culture of its spleen yielded a few colonies of tubercle bacilli which were proved to be of the avian strain. The second guinea pig inoculated with the same sample of milk was entirely negative. This one positive finding was thought to be a spontaneous infection of the guinea pig with an avian strain of tubercle bacilli. These studies tend to show that the milk and colostrum of women with pulmonary tuberculosis and without clinical lesions of the breast rarely show tubercle bacilli and that the fear of contamination of the infant is less by means of breast milk than by direct infection by inhalation or ingestion of droplets containing tubercle bacilli.—*Recherches du bacille de Koch dans le lait et le colostrum des femmes tuberculeuses, J. Petresco, Compt. Rend. Soc. Biol., May 11, 1935, cxix, 165.*—(*M. T. W.*)

Diagnostic Problem of Dyspnoea.—The author presents a case study of a man aged 48, who had never been ill before, who began to suffer with a paroxysmal dry cough and about five weeks later with severe dyspnoea, which gradually and persistently increased in severity until his death two months later and yet was unaccompanied by any cyanosis until there was evidence of terminal heart failure. Roentgen study of the lungs disclosed that the posterior mediastinum was apparently clear, though narrow in the center. There was marked increase of the hilar shadows, particularly on the right. Shadow markings were general on both sides, with some mottling on the right, suggestive of small areas of consolidation. It was felt at first, after the failure of exhaustive clinical and laboratory studies to determine the cause, that his symptoms probably were due to myocardial failure, but this idea was abandoned as orthopnoea and coughing increased, and as abdominal distention became marked. Gastro-intestinal studies were negative. After death an autopsy revealed extensive malignant infiltration of the stomach with metastases to the lungs and all regional lymph nodes, with chylous ascites and pulmonary atelec-

tasis. Emphasis is placed upon the fact that a far-advanced carcinoma of the stomach may exist, with extensive metastases, without gastric symptoms, without impairment of nutrition and without anaemia. The X-ray of the lungs was perhaps the most suggestive, but not conclusive, finding.—*Diagnostic Problem of the Causation of Dyspnea, L. M. Gaines, J. Am. M. Ass., February 23, 1935, civ, 632.*—(*G. L. L.*)

Principles of Activity in Tuberculosis.—Tuberculous processes may be compared to tissue-grafts, normal for civilized man and ordinarily innocuous, insignificant and unfelt, and by and large therefore outside the realm of medical practice. It is probably only once in dozens of times that tuberculous infection evolves into illness. However, if nutritive substances from the body can penetrate the interior of the tubercle, in however slight amounts, we must believe that intrafocal materials must emerge, however small their quantity, and this is evidenced by the maintenance of the allergic state through the years in animals and humans with but minimal tubercle, consisting of old sclerotic formations. These subjects may never show or feel the slightest derangement and be in full health and vigor, yet something must emanate from such foci and allergize their tissues. Ordinarily this influence works no outward signs, yet in proportion as their elements diffuse out, and depending on the form and location of the process, bodily functions may be modified and upset. Usually their effects are too slight to be noticeable and it should need no extended argument to convince one that not all persons who harbor tubercle are proper subjects for active medical intervention. Which then do require attention? It is not always easy to decide. Attention to the tuberculin reaction alone will be of little help and too great reliance on structural features of the foci may lead us astray. Are these foci affecting the possessor to his disadvantage or likely to do so? If so, it is standard practice to intervene now, to prevent or abate future detrimental developments. Tuberculosis has for over a century been an expanding field for medical practice. In 1825 about its only recognizable form was one which in 1911 was known to be far advanced. On the other hand tuberculous laryngitis in 1900 stood about where pulmonary tuberculosis did in 1825; but by 1910 earlier nodular and nonulcerating forms were being diagnosed and treated. In the same way, earlier recognition of tuberculous enteritis advanced between 1910 and 1925. To-day we teach that meningeal foci are significant and ominous and likewise we have no knowledge of tuberculous processes in bones, joints and kidneys that do not presage worse conditions unless checked. The tonsils provide a contrasting set of conditions. The presence of tubercle has been shown to be not uncommon yet few would set apart tuberculous infection of the tonsils as requiring active treatment. Removal is more often done because of associated cervical lymphadenitis and on empirical grounds. Cervical lymphadenitis *per se* is probably more often ignored or merely noted and observed than actively treated. Pulmonary tuberculosis, responsible for nine-tenths of all deaths from tuberculosis, has attracted most interest. Yet, because of its great variability, has arisen the necessity of arriving at some standards governing the selection of infections for treatment, for to commit all discoverable pulmonary tuberculosis to routine care is not only unwise and unnecessary but often positively detrimental. If "activity" had a uniform and unequivocal way of displaying itself matters would be relatively simple, but the truth is that authorities are not in agreement in their concepts of activity. There is more tendency to agreement on the proposition that inactivity is indicated by the combined factors of local and constitutional harmlessness and nonprogressiveness. *Evidence contributing to appraisal of activity:* This consists of (1) biological, (2) physical and roentgenological, (3) functional, and (4) historical. Of these the functional disturbances rank first. Any show of symptoms, if they can be correlated with demonstrable tuberculous foci, and not due to residual processes, indicates activity. There is more divergence on the question of activity without symptoms and whether there exist special anatomical or immunological characteristics. As for the tuberculin test, the vigor of allergic reactivity cannot be shown to have any uniform correlation with clinical manifestations or lack of them. Substantially the same verdict can be rendered on complement-fixation, serum flocculation, erythrocyte sedimentation, and every other kindred test. Used alone as measures of individual differentiation, they all break down lamentably. Structural or anatomical features, such as derived from X-ray examinations, likewise can never be more than approximately exact, and lack the sharpness and precision of direct sectional or necropsy observation. Nearly all those cases which are unequivocal also manifest functional disturbance and then activity is better revealed by symptoms. If these exist, anatomical proof of activity is superfluous; therefore, if anatomical standards are to determine activity they would have to

presage impending functional disturbance. A similar idea animates the concept of *pathological activity*. As for progression of anatomical changes, as evidenced by repeated serial X-ray or physical examinations, we deal only in probabilities at best. It is equally common for functional derangement to antedate detectable structural change. Thus, while periodic observation and comparison of anatomical status can render some assistance, too much reliance on it will be often misleading and lead to a high proportion of error. To estimate activity from single observations, roentgenographic or otherwise, is generally thoroughly unscientific. It is especially in those cases with slight or equivocal symptomatology or none, and relatively minor anatomical changes that such morphological criteria break down. If activity has any functional connotation, claims to its appraisal on the basis of a single examination or X-ray rest on nothing more sound that ignorance or charlatanry. As nearly as can be made out, concepts of pathological activity are based on manifestations of focal progression or evolution, apart from symptoms. But if such "progression" is thus interpreted without qualification as meaning "activity" we arrive at a *reductio ad absurdum*, since no tubercle can originate without some cell proliferation. As a matter of fact, the effects of tubercle can have little meaning in the absence of close attention to the person himself. It is the response of the organism to infection that betrays the latter's influence. Thus we search for the expression of functional disorder in symptoms in a terrain beset with illimitable variables. The puny, wan, spare and listless child has really active tuberculosis if a tuberculosis infection can be shown to underlie these disorders. A nervous system made overirritable by virtue of the absorption of inconsiderable focal material, is often set jangling by active tuberculosis. The diversity of constitutional effect is notorious and must be due to variability of constitution among the infected. The sensitive patient is affected at his most sensitive point. Slight evidences of functional disorder are too often overlooked or misconstrued. Functional tests of activity involve investigations of the tolerance to stress possessed by persons with discovered tubercle. Thus activity is signalized not only by symptoms complained of but by those elicited by subjecting the individual to physical or psychic strain and the borderline is very ill defined. Not a few patients with old chronic phthisis discover they have the status of their infection in their own keeping. If they transgress the limits set by experience, symptoms ensue. Thus, close attention to symptoms (and past history) leads, if properly employed, to the fewest errors in judgment. But now and then some extraordinary situation arises, as in passing judgment on army recruits. Here the prospects of exceptional stress and hardship lead to stricter standards. In general, with but few exceptions, it is a sound principle to put under treatment without delay cases of tuberculous infection deemed active. Especially if the patients are young there is little reason to compromise; but if mature or elderly, with affairs and responsibilities, the principle must be qualified. It is poorly informed and inexpert practice that awaits the appearance of a categorical symptomatology. If there is one symptom most common and readily incited yet most delicate, it is overfatigability. Myriads enter on a career of active chronic phthisis through this portal of overtiredness, or hypotonia. Also, in the absence of other plainly apparent disorders and disabilities, a story of lifelong abstention from physical exercise because of uncomfortable reaction, should always suggest smouldering tuberculous infection. The fires of long-engrafted pulmonary tubercle burn low but are never completely banked in such cases.—*The Principles of Activity of Tuberculous Processes, A. K. Krause, Tubercle, February, 1935, xvi, 208.*—(*A. P.*)

Phlyctenular Conjunctivitis and Tuberculous Infection.—A total of 139 cases with well-established diagnoses of phlyctenules and tuberculosis were studied in the childrens' clinic and eye clinic of the University of Lund during 1920–1934. Most cases occurred in very young children, between one and two years of age, and decreased with increasing age. They were about equally distributed between the sexes. Most of the cases occurred in the first four months of the year, reaching a maximum in February. Numerous cases of phlyctenules with negative tuberculin reactions occurred. On the other hand, they were found so much more frequently accompanying tuberculous infection than any other disease that tuberculous infection must play some rôle. Phlyctenular eruptions were usually accompanied by a very high degree of tuberculin skin sensitiveness. Such eruptions occurred in adults when toxic tuberculosis broke out suddenly. —*Studien über Conjunktivitis Phlyktaenulosa im Kindesalter, unter besonderer Berücksichtigung ihres Verhältnisses zur Tuberkuloseinfektion, S. A. Siive, Acta Tuberc. Scandinav., 1935, viii, fasc. 4, 225.*—(*F. B. S.*)

Three Cases of Uveoparotid Tuberculosis.—This term was suggested by Garland and Thomson for a clinical syndrome originally described by Heerfordt in 1909 and characterized by inflammation of the uveal tract, enlargement of the parotid glands and sometimes cranial nerve paralysis, especially facial. Garland and Thomson, who reviewed 47 cases, described the disease as running a chronic course, and due to tuberculosis of a particularly fibrosing and noncaseating type, tending to recovery, but rarely leading to death from miliary tuberculosis. Other writers have referred to the condition as "uveoparotitic paralysis" (MacBride). Most reports have appeared in European Continental journals and Heerfordt used the term *febris uveoparotidea subchronica*. Previous case reports (to Garland and Thomson) had appeared mainly in ophthalmological journals. Three cases are here reported, as follows: *Case 1:* A woman of 35 complained of aching of eyes and blurred vision of the right, onset of symptoms gradual. There was a mild iridocyclitis, first of the right, then the left eye, developed swelling of the left parotid gland, and paresis of the left facial nerve. Later there occurred optic neuritis, dysphagia, dryness of mouth and throat, and regurgitation through the nose on swallowing. Her family history was negative for tuberculosis except for one child having had tuberculous peritonitis. The patient herself, however, had been losing weight and having night-sweats for twelve months. Physical signs in the chest were negative when admitted to the Leicester Royal Infirmary for observation, her temperature was normal, Wassermann reaction of blood and spinal fluid negative, Mantoux test negative, and skiagrams of the chest showed mediastinal opacities suggestive of enlarged lymph nodes. The symptoms, except the optic neuritis, subsided in four weeks and a year later a little nodular thickening behind the angle of the jaw was the only abnormal finding. The chest skiagrams were now clear. *Case 2:* A woman of 54 was admitted with a history of alternate swelling of both sides of the face, of eight weeks' duration, and left facial paresis for five weeks. There was bilateral parotid enlargement and iritis. Skiagrams of the chest showed marked exaggeration of root shadows on both sides with mottling of upper lung fields, especially the right. Microscopical examination of sections from both parotids showed areas of chronic inflammation typical of tuberculosis, and tubercle bacilli. The symptoms noted gradually improved during three weeks observation but when seen two years later she showed manifest pulmonary symptoms and suggestive pulmonary signs, with little change in the skiagram. Manifestations of old iritis persisted and slight left facial paresis. The Mantoux test was positive. More recently there was X-ray evidence of progression of the lesion in the right lung. *Case 3:* A woman of 41 complained of a "mist over the eyes" for three weeks. She showed iridocyclitis, posterior synechiae, and punctate keratitis, and four weeks later left parotid swelling followed by facial paralysis. The patient's mother had died of pulmonary tuberculosis and, though chest signs were negative, X-ray examination revealed a chronic pleurisy on the right side. The blood-Wassermann reaction was negative. In this case the iridocyclitis progressed, particularly in the left eye. *Discussion:* Manifestations of uveitis, preceded or followed by parotitis, occurred in every case. The eye changes tended more to persist. The facial paresis, of a lower motor neurone type, was probably secondary to the parotitis. The optic neuritis and dysphagia are thought to be due to a toxic neuritis. In only one of these 3 cases was tuberculosis clearly proved but the evidence was suggestive in the others.—*Uveoparotid Tuberculosis, a Report of Three Cases, S. E. Tanner and A. L. McCurry, Brit. M. J., December 8, 1934, 3857, 1041.*—(*A. P.*)

Laryngeal and Cervical Tuberculosis.—Roentgen study should supplement the laryngologist's examination. Complete roentgenoscopic examination includes observation during phonation, inspiration, expiration, and swallowing with and without barium. The routine roentgenographic examination consists of two lateral views taken by teleoroentgenography. One exposure is made with the larynx at rest and the other during phonation, employing a high-pitched E sound. The patient sits erect with his body and head in true lateral position and the head in a head-rest. The shoulders are dropped and drawn back with one shoulder resting against the cassette. The mandible is extended forward and held horizontal to the floor. An 8 x 10 inch film is used in double intensifying screens. The central ray is projected through the midportion of the thyroid cartilage. The following factors are used: 55 Kv., 100 Ma., at 1/20 or 2/20 of a second. When the thyroid cartilages show considerable calcification oblique positions are taken. The air in the neck acts as a contrast medium and the following spaces are recognized: pharynx, vestibule of larynx, ventricle, and subglottic region. The vestibule is triangular in shape, bounded anteriorly by the glottis, posteriorly by the aryepiglottic folds above, and the

arytenoid eminences below. The apex of the triangle is formed by the junction of the epiglottis and the aryepiglottic folds. The ventricular bands of the larynx form its base. The laryngeal ventricle is an oval space, with more or less convex upper and lower borders, situated between the true and false cords, and extending from the thyroid cartilage anteriorly to the vocal processes of the arytenoid cartilages posteriorly. The cords appear as more or less sharply defined bands except that the upper margins of the false cords and lower margins of the true cords gradually taper off into the adjacent structures. The tuberculous lesions are classified as (1) minimal lesions when located either in the ventricle or in the interarytenoid area or both; (2) moderate when involving the arytenoid eminences with extension either into the interarytenoid area below or the aryepiglottic folds above, and maybe adjacent tissue; and (3) extensive when practically all the laryngeal structures with or without contiguous tissues are involved. A study of 100 cases (65 males and 35 females) showed neither the quantitive involvement of the lungs nor the age of the pulmonary lesion to have any bearing on laryngeal tuberculosis, but 93 of the 100 cases had caseous pneumonic type lesions. Infection of the larynx by the lymphatic or haematogenous route is probably far greater than is generally supposed. Twenty of the cases had complicating extrapulmonary tuberculous lesions and the 6 cases not having the caseous pneumonic type of tuberculosis had little or no expectoration and seldom had tubercle bacilli in the sputum. Eight patients had no laryngeal symptoms. Of these, 3 were of 15 cases with minimal lesions; 4 of 56 with moderate lesions; and 1 of the 29 with extensive lesions. Hoarseness was present in 85 cases, pain in 18, dysphagia in 7, aphonia in 9, dryness in 9, tickling in 4. Thirty of the patients had symptoms of 3 to 7 months' duration, 59 patients for a year or less and, of these, 8 had minimal, 37 moderate, 14 extensive lesions; and 18 patients for one to two years and, of these, 8 had minimal, 6 moderate, and 9 extensive lesions. Laryngeal tuberculosis occurs with about equal frequency in both sexes below twenty years, 10 in each; between 20 and 40 years, 23 in females and 38 in males; beyond 40 it is not frequent and in the female it is rare. Roentgen study is an aid in the diagnosis of laryngeal tuberculosis. Small intraventricular lesions which may be missed on mirror examination are demonstrated on the roentgenogram but small lesions situated deep in the interarytenoid area are not detected on the roentgenogram. The roentgen study also gives a permanent pictorial record.—*A Roentgenologic Study of Tuberculosis of the Larynx and Neck, H. K. Taylor and L. Nathansen, Am. J. Roentgenol., November, 1934, xxxii, 589.*—(*E. M. J.*)

Treatment of Primary (Idiopathic?) Pleurisy.—The chief causes of pleurisy are reviewed, among which tuberculosis is given the leading place. The occurrence of "rheumatic pleurisy" is doubted, though it is noted that pleurisy may be associated with herpes zoster. However, the commonest, if not the only cause, of so-called primary or idiopathic pleurisy is tuberculosis, the infection occurring either from the lung or the mediastinal lymph nodes by lymphatic spread. *Dry pleurisy:* Relief of pain is the first desideratum in most cases and the simplest method is a firm bandage or strapping of the hemithorax. Also, the parietal pleura over the most painful area may be infiltrated with 10 to 20 cc. of a 1 per cent novocain solution. Complete rest should be insisted on for at least two weeks, or if fever is present, for two weeks after the temperature has returned to normal. A careful temperature record should be kept, the sputum examined for tubercle bacilli, and an X-ray photograph of the chest taken. At times the severity of pleuritic pain is such as to require an opiate, and leeches are thought very efficacious. The after-treatment or convalescence should be carefully followed, and rest, fresh air and abundant nourishment, but *not* exercise, prescribed. X-ray photographs at three-month intervals are recommended, for the importance of pleurisy in tuberculosis is as great as that of haemoptysis. *Pleurisy with effusion:* The onset may be insidious, with malaise and increasing dyspnoea, or it may be more abrupt. Its course is usually about three weeks when acute and the patient may be very ill. Exploratory puncture is often advisable to determine the character of the fluid and should not be done at too low a level. Good local and regional anaesthesia with a fine needle should precede puncture, and the operator is cautioned not to insert the needle to the hilt, where breakage is most common. Paracentesis is advised under the following circumstances: (1) distress, cyanosis or dyspnoea; (2) excessive mediastinal displacement; (3) failure to absorb within three or four weeks; (4) progressive increase; (5) if elevation of temperature persists; and (6) if there is evidence of underlying pulmonary tuberculosis and the other side is clear. In this case air should be introduced. If the effusion is left too long the pleura may become greatly thickened and the lung fail to reëxpand. The dangers of paracentesis are practically all caused by

too high a negative pressure in the pleural cavity, producing a strain on the lung, its capillaries and lymphatics, and on the mediastinum. They consist of (1) cough, discomfort and pain; (2) dyspnoea; (3) haemoptysis; (4) acute oedema of the lung; and (5) syncope or sudden death. All of these can be avoided by the use of gas replacement—sterile air or oxygen—leaving a pneumothorax, which is gradually absorbed as the lung reëxpands, and also assists re-expansion. During aspiration, if pain or discomfort are experienced, the symptoms can be immediately relieved by removal of the tube from the needle or cannula, covering the aperture with gauze, and allowing the patient to take a few breaths, aspirating air. Often this occurs accidentally. The two-needle method, using the artificial-pneumothorax apparatus, is better and more scientific, as the amount of gas can thus be measured and the intrapleural pressure controlled. Also, if it is desired to introduce oxygen instead of air, the gas-bottle of the pneumothorax apparatus is first filled with this gas. The simplest method of aspiration is siphonage, requiring only a needle, rubber tubing, and a bottle containing a 1 per cent phenol solution. After attachment of the tubing to the needle and placing of the distal end under the fluid in the bottle, a cough will usually start the siphonage. Dieulafoy's aspirator is more handy than Potain's. A simple method of "automatic" air replacement consists of inserting a pneumothorax-size needle in an interspace well above the site of aspiration, covering it with gauze, and then allowing air to be drawn into the pleural cavity as fluid is removed below. Complete withdrawal of fluid is unnecessary, as the residuum will be absorbed. *After-treatment:* This is the most often neglected factor. Prolonged convalescence and improvement of general hygiene are urgently necessary and a period of sanatorium residence is safest unless ideal conditions can be found elsewhere. Careful observation for at least two years is required.—*The Treatment of Pleurisy, F. G. Chandler, Brit. M. J., December 29, 1934, no. 3860, 1209.*—(*A. P.*)

Tuberculous Empyema.—Careful bacteriological study is the keynote of the proper treatment of empyema. It is all important that a tuberculous empyema be differentiated from one of purely pyogenic origin, and also that it be well established whether a tuberculous empyema is or is not secondarily infected. Rarely, if ever, does an empyema constitute a surgical emergency, for embarrassing pressure symptoms or toxaemia can be adequately relieved by aspiration until the causative organism is identified. The importance of this lies in the fact that a nonsecondarily infected tuberculous empyema should never be treated by external drainage, for rib-resection precludes the possibility of cure by other than prolonged treatment and extensive surgical procedures. If the fluid is seropurulent in character, the treatment is the same as for a purely serous effusion. Aspiration should be resorted to only when pressure symptoms have developed or when the fluid fails to be absorbed after a reasonable period of time. When the fluid is definitely purulent and present in large quantities early and repeated aspirations with replacement of air seems to achieve the best results. If there is much underlying pulmonary involvement, increased pleural thickening, lack of improvement in the patient's condition, or if, after repeated aspirations, the cavity remains undiminished, thoracoplasty should be considered; for complete reëxpansion of the lung may not be possible because of thickened pleura or parenchymal fibrosis; and, furthermore, reëxpansion of the lung may not be desirable on account of the danger of lighting up the pulmonary disease. Decortication should probably never be carried out for the same reasons. An unroofing operation should also not be performed if the cavity is large. The cases with mixed infection may be treated the same as the nonsecondarily infected ones, unless open drainage has been previously performed, or in the presence of bronchial fistulae, marked toxaemia, or long duration. In the presence of a bronchial fistula, open drainage should precede the completion of a thoracoplasty, preferably through a small independent opening well away from the operative field. The risk of graded operations is not great, provided the general condition of the patient is moderately good. In addition to the usual preoperative preparation, the routine treatment at the Saskatoon Sanatorium is especially directed to minimize, as much as possible, all pulmonary complications resulting from upper respiratory infections. This routine includes the extraction of all loose teeth and the treatment of any gingival infection that may be present. The day preceding operation, a thorough antiseptic toilet of mouth, nose and throat is carried out by careful cleansing of the teeth, nasal douches and throat gargles. This is repeated twice on the morning of the operation, and on the same morning the patient is encouraged to empty the lungs of all sputum. Fifteen cases of proved tuberculous empyema are reported in which the ideas outlined above were utilized in the guidance of surgical treatment. Ten of these patients were discharged as well and returned to their work.

One was classified as "improved." One died after operation. One died four months after discharge as a result of an operation for acute intestinal obstruction, and the remaining patient had been operated upon too recently to classify.—*The Surgical Treatment of Tuberculous Empyema, R. H. Macdonald, S. G. O., February, 1935, lx, 216.*—(*A. E. M.*)

Acute Primary Diaphragmitis.—Three case histories are given to illustrate the new Syndrome of "acute diaphragmitis," or "Hedblom's syndrome." Inflammation of the diaphragm causes ponopnoea, painful cough, rigidity of the abdominal muscles, pain in the abdomen, costal margin, or even at the angle of scapula, and immobilization of the diaphragm as evidenced by roentgenography and costal breathing. The intimate relationship of the *transversus abdominis* and the diaphragm at their insertions may explain the spasm and rigidity of the abdominal muscles. Hiccough is seldom encountered since the wing, and not the pillars, of the diaphragm are involved. Pathologically, the diaphragm undergoes the changes of an acute exudative and proliferative inflammation and the muscle fibers may be replaced by scar-tissue and thus a flattening or even disappearance of the normal dome of the diaphragm results. Pleural involvement by contiguity may result in diaphragmaticopulmonary adhesions. It is justifiable to consider that this syndrome is primary, since it evidently follows an acute nasopharyngeal inflammation in much the same manner as pneumonia, influenza, or even some cases of acute appendicitis. Obviously, it may also occur secondary to diseases in the adjacent organs. The syndrome is common, but is often masked by an associated picture. Many so-called pleurisies, particularly of the diaphragmatic type, are really those of Hedblom's syndrome as may also be true of so-called mild appendicitis or cholecystitis. Certain basal pneumonias probably have their origin in an acute inflammation of the diaphragm.—*Acute Primary Diaphragmitis (Hedblom's Syndrome), M. Joannides, Am. J. M. Sc., April, 1935, clxxxix, 566.*—(*E. M. J.*)

Endocardial Tuberculosis.—Endocardial tuberculosis is occasionally encountered at necropsy, usually as a part of generalized miliary or disseminated tuberculosis. It was found 6 times in about 900 consecutive necropsies at The Duke Hospital. In five of these cases it was a part of the generalized process. In the sixth case the endocardial lesion resulted from the extension of pericardial and myocardial tuberculosis through the cardiac wall. The above cases are reported in detail followed by a general review and discussion of the literature. In tuberculosis of the endocardium scattered tubercles from microscopic size to a diameter of 3 or 4 mm. may occur in any part of the endocardium, including the valves. Some of these tubercles may be caseous. Endocardial tuberculosis may interfere with cardiac function in the rare instance in which caseous nodules involve the valves. The tubercles probably arise by implantation through the coronary arteries and directly from the general blood-stream. Rarely may they be polypoid or pedunculated. Endocardial tuberculosis may also develop from the extension inward of pericardial and myocardial caseous masses (case 6), which may ulcerate and produce generalized tuberculosis. A convincing report of tuberculous endocarditis as a diffuse process at the line of closure of the valves, somewhat analogous to rheumatic and pyogenic endocarditis, has occurred in the literature possibly once. In general, however, tuberculosis has no especial affinity for the line of closure and does not produce thrombotic vegetations. Sclerosis of the endocardium and healed fibrous and calcified valvular lesions noted at autopsy were not shown to be due to the toxic action of a tuberculous process elsewhere in the body.—*Endocardial Tuberculosis, R. D. Baker, Arch. Path., May, 1935, xix, 611.*—(*J. S. W.*)

Calcification in Intestinal Tuberculosis.—Since the ulcerative type with its sloughing of the caseous Peyer's patches makes up 80 per cent of the tuberculous lesions of the intestines, the rarity of calcification here is explained. Its occurrence is most likely when the infection penetrates the intestinal wall and tubercles form on the peritoneal surface. Roentgenograms of 5 cases support this view, since the calcium deposits conform to miliary and conglomerate tubercles which in some instances had become confluent. Calcification in tuberculosis is regarded as a sign of healing in certain areas, although in other areas of the same lesion there may be progression. In the 4 cases examined more than once, all accepted roentgenological technique was used to discover intestinal tuberculosis and in all cases the signs as well as the symptoms of the disease were present. Repeated roentgenograms, before taking and following evacuation of the barium meal, showed the shadows to be constant in size, contour and position. These calcium deposits are to be differentiated from those in abdominal lymph nodes and in those left by intramuscular injections of metallic salts. In the former there may be mottling but the node is more or less

outlined. In the latter there are clusters, but they do not have the miliary appearance. The roentgenological demonstration of calcium will probably be of the greatest value in an estimation of the extent of healing and the benefit of treatment in intestinal tuberculosis. The histories and roentgenograms of 5 cases are given. The ages range from 23 to 51 years. Pain in the abdomen was a constant symptom. In two cases there was evidence of healed pulmonary tuberculosis.—*Calcification in Intestinal Tuberculosis, C. H. Heacock, Am. J. Roentgenol., December, 1934, xxxii, 782.*—(*E. M. J.*)

Tuberculous Arteritis.—A case of tuberculous arteritis is described, in which the arterial disease was the only tuberculous lesion found in the body. In a woman, 63 years old, dying of heart failure and bronchopneumonia, changes were found in the coronary and intracranial carotid arteries, histologically characteristic of tuberculosis. The lesions consisted of foci of necrosis and granulation tissue containing epithelioid cells, lymphocytes, plasma cells, fibroblasts and giant cells. Acid-fast bacilli were not found. No tuberculous foci were present from which direct spread to the arteries concerned could have occurred. Old tuberculous nodules were found in the lungs and a tracheo-bronchial lymph node.—*Tuberculous Arteritis, W. G. Barnard, J. Path. & Bact., May, 1935, xl, 433.*—(*E. R. L.*)

Intestinal Tuberculosis.—Ulcerative intestinal tuberculosis is a frequent complication of pulmonary tuberculosis. Seventy-two per cent of the fatal cases of pulmonary tuberculosis at the Metropolitan Hospital in New York City were found at autopsy to have ulcerative enteritis. Two thousand and eighty-six patients with pulmonary tuberculosis were therefore examined for the presence of intestinal tuberculosis. These patients were consecutive admissions with the exception that far-advanced toxic or terminal cases were excluded from this study. As a rule minimal cases are not admitted to the Metropolitan Hospital. In most instances the pulmonary lesion was classified as moderately or far advanced. The patients were largely indigent, many were undernourished, improperly fed, and many had had inadequate medical care previous to admission. In 38 per cent definite radiographic evidence of tuberculous enteritis was found. The diagnosis was made fluoroscopically, films not being taken to save expense. A diagnosis of ulcerative enteritis was considered justified if one or more of the following signs was present: Stierlin phenomenon, spastic filling defect, filling defect with palpable tumor, persistent irregularity of caecum; or persistent mottling after reëxamination of caecum and ascending colon, segmentation, dilation, matting, or adherence of ileal loops. Although the accuracy of diagnosis is difficult to check in most cases as few patients are operated on and in those that come to autopsy there is often a lapse of months between the time of examination and death, nevertheless, careful roentgenographic diagnosis can be accurate. Out of 59 patients who had been examined roentgenographically and who were subsequently autopsied, the X-ray diagnosis was confirmed in 43. In 10 of the remainder in whom a negative diagnosis had been made clinically, and ulcerative enteritis found at autopsy, the interval between examination and autopsy varied from 6 to 28 months and it is probable that the intestinal ulcers had developed in the interim. In 6 cases the roentgenoscopical diagnosis was incorrect. The X-ray diagnosis was therefore correct in 88 per cent. It is difficult in a tuberculous individual to differentiate between gastrointestinal symptoms engendered directly by an ulcerative enteritis from those resulting from the absorption of toxins from the pulmonary lesions. Symptoms often occur late in tuberculous enteritis. Of 744 tuberculous patients with definite X-ray evidence of ulcerative enteritis, only 29 per cent complained of gastrointestinal symptoms at the time of examination. In 999 tuberculosis patients with a relatively normal gastrointestinal tract, 18 per cent complained of gastrointestinal symptoms. The order of frequency of symptoms for patients with intestinal tuberculosis in this group was: pain, diarrhoea, dyspepsia, constipation, constipation alternating with diarrhoea, and vomiting. There is apparently a direct relationship between a positive sputum and intestinal tuberculosis. Of 740 patients with intestinal tuberculosis the sputum was negative for tubercle bacilli in only 4.5 per cent. Of 979 patients with a normal intestinal tract, a negative sputum was found in 18 per cent. The presence of tubercle bacilli in the sputum therefore favors the onset of a secondary intestinal tuberculosis, while a consistently negative sputum precludes this complication. One hundred and fifty patients were sigmoidoscoped and only 2 showed discrete ulcers in the rectum which had the clinical appearance of tuberculous ulcers. There is a direct relationship between pulmonary cavitation and ulcerative enteritis. Ninety-five per cent of the enteritis cases had pulmonary cavitation. The converse of this does not follow. Of 74 patients with normal gastrointestinal tracts,

45 had pulmonary cavities. From a pathological study of the distribution of the lesions it is inferred that about 90 per cent of tuberculous lesions occur in the terminal ileum, caecum and ascending colon. The successful treatment of intestinal tuberculosis depends primarily on inactivation of the source of infection in the lungs, so that prime emphasis must be directed toward attaining a negative sputum and a decrease in toxic absorption. Specific local treatment is directed primarily toward fostering peristaltic rest in the involved segments of the intestine. A smooth, low residue, high caloric diet, with added tomato juice and codliver oil is advocated. Abdominal pain may be controlled by heat or sedatives, and constipation combated by small amounts of mineral oil or by gently administered warm saline enemata. Diarrhoea is controlled by administration of barium sulphate or kaolin, and, if necessary, tincture of opium.—*Intestinal Tuberculosis, E. Granet, Am. J. Digest. Dis. & Nutrition, June, 1935, ii, 209.*—(*A. E. M.*)

Renal Tuberculosis.—The diagnosis of renal tuberculosis has not kept pace with that of pulmonary tuberculosis mainly because there has not been sufficient attention paid to it. It is generally agreed that renal tuberculosis is never primary. All cases of generalized tuberculosis are candidates for a renal infection. The route of infection is debated. The prevailing idea regarding the onset of unilateral lesions is that bacilli reach both kidneys, but are progressive on one side only. Seventy-five per cent of early lesions are cortical. In the early diagnosis of renal tuberculosis it should be remembered that a normal kidney does not excrete tubercle bacilli, and that some healing does occur but not to such a degree as to exclude surgery in a case of unilateral disease. With increased thoroughness the number of bilateral infections will be diagnosed, and unnecessary surgery avoided. In all cases, an attempt should therefore be made to determine the type and extent of a renal lesion. This can only be well done by combining laboratory examinations, X-ray, and urological methods. The laboratory offers examination of stained sediment, culture and animal inoculation, each of which have certain limitations. For exactness, all methods should be employed. X-ray offers information as to the condition of the patient's chest. A good history is indispensable. A renal infection may exist without a history of previous urinary symptoms and remissions may give a false sense of security, making the diagnosis more difficult. Bilateral ureteral catheterization is useful in all cases to obtain specimens for examination unless a nonfunctioning tuberculous organ is present on one side, and the other shows good excretion of indigo-carmine through a normal ureteral meatus. Intravenous indigo-carmine, to determine function, however, is generally not sufficient, and adds little to the diagnosis, but in using urography the principle should be followed that it is not necessary if a diagnosis can be made without it. When the cystoscopic examination is essentially negative, and cultures and smears are negative, it is the only means of showing the lesion, which is seen as a filling defect. Retrograde urography is more accurate. Excretion urography frequently fails to outline pelvic deformities except where there is some obstruction. This is especially true in early lesions. But excretion urography may be of value when cystoscopy and ureteral catheterization are impossible. It is also to be remembered that renal tuberculosis may be present with other renal lesions. Recent literature points out that the coëxistence of renal and genital tuberculosis can be demonstrated more frequently, recent studies showing an incidence of 34 per cent before or after nephrectomy. Indeed, a patient is more apt to come in because of genital involvement than for renal symptoms.—*Renal Tuberculosis, C. J. Rucher and T. R. Fetter, Radiol., February, 1935, xxiv, 100.*—(*G. F. M.*)

Renal Tuberculosis.—The author, in discussing the indications for nephrectomy in renal tuberculosis, points out that Medlar has demonstrated by complete serial section of kidneys from patients showing tubercle bacilluria that renal tuberculosis is originally a haematogenous lesion, doubtless usually bilateral. There is always a period of initial clinical quiescence (perhaps often lasting several years) during which either (a) These lesions heal in one or both kidneys—renal bacilluria, nonsurgical renal tuberculosis, or (b) in one or both kidneys gross destruction of tissue occurs. This is surgical renal tuberculosis. The author condemns temporizing with this latter condition. The surgically tuberculous kidney is doomed and even pathological nephrectomy, rare as it is, often fails to mean healing of the tuberculosis. Surgical renal tuberculosis, characterized by gross changes shown by pyelography, is clinically a progressive disease with a fatal termination unless interrupted by nephrectomy. The pyelogram discloses surgical tuberculosis. The earlier the nephrectomy, the greater the probability of cure.—*The Spontaneous Healing of Renal Tubercu-*

losis, E. L. Keyes, J. Am. M. Ass., April 20, 1935, civ, 1380.—(G. L. L.)

Incidence of Renal Tuberculosis.—Neglect in recognizing tuberculosis in other parts of the body often leads to a failure in the recognition of early renal involvement. The recognition of early preclinical renal tuberculosis requires the greatest care, and, until some reliable method is developed, every effort must be made to correlate all clinical, roentgenological and pathological data. The authors submit a statistical compilation covering 500 necropsy cases from a 1750-bed institution for the treatment of tuberculosis. Of the 500 cases, 252 showed evidence of tuberculous infection. Miliary tubercles were found in 228, or 45.6 per cent. In this group the disease was found to be bilateral in 187 cases, or 82 per cent, and unilateral in 41 cases, or 18 per cent. The youngest patient of this group was 9 months old and the oldest 74 years. The average age was 36. Only 25 per cent had urinary symptoms. Of the 500 cases, organic tuberculosis was found in only 24 cases, or 4.8 per cent. By organic tuberculosis is meant a destruction of the renal substance. In this group the disease was found to be bilateral in 13 cases, or 54 per cent, and unilateral in 11 cases, or 46 per cent. The youngest of the group was 23 and the oldest 50 years of age. The average age was 39. In 16 cases the tuberculosis was extrapulmonary and the renal involvement bilateral. In all but one it was of the miliary type. The youngest of this group was 1½ years and the oldest 56 years of age. The average age was 22. It is the authors' belief that careful postmortem examination will often reveal a high incidence of bilateral miliary renal tuberculosis. This must not be interpreted as meaning that clinically bilateral miliary renal tuberculosis is common, but rather that this occurred as a terminal manifestation of the disease a few weeks prior to death.—*The Incidence of Renal Tuberculosis: In Five Hundred Autopsies for Pulmonary and Extrapulmonary Tuberculosis, M. E. Greenberger, L. P. Wershub and O. Auerbach, J. Am. M. Ass., March 2, 1935, civ, 726.—(G. L. L.)*

Genital-Tract Tuberculosis.—The author is convinced, from the study of a long series of his operative results, that the addition of seminal vesiculectomy to epididymectomy in cases of genital tuberculosis has given far better results than were ever obtained by simple epididymectomy, and that the radical operation in itself is accompanied by a minimum of danger, the fatalities having in all instances been of patients with severe complications. In support of this firm belief, he draws the following conclusions: The disease arises more commonly in the prostate and vesicles than in the epididymis. Genital tuberculosis is ultimately accompanied by tuberculosis of the lungs or kidneys in a large percentage of cases. If the seminal vesicles are involved, adequate drainage is not furnished by the ejaculatory ducts, and from this region the disease progresses downward to the epididymis or upward to the kidneys or lungs. The presence of renal tuberculosis, which has occurred in about 30 per cent of the author's cases, is no bar to carrying out the radical operation, in addition to nephrectomy, and curative results may thus be obtained. The presence of old or recent tuberculosis of the lungs is often no contraindication to the radical operation; in fact, it is one's duty to assist, if possible, in the arrest of pulmonary tuberculosis by removing the external foci of tuberculosis. If the disease is apparently localized within the scrotom, most careful examinations should be made to rule out involvement of the vesicles and prostate before relying entirely on epididymectomy, which generally will not arrest tuberculosis of the vesicles. The radical removal of the seminal tract, both epididymides, vasa, vesicles and lateral lobes of the prostate is the operation of choice.—*Tuberculosis of the Genital Tract, H. H. Young, J. Am. M. Ass., March 2, 1935, civ, 722.—(G. L. L.)*

Tubercle Bacilli in Urine in Advanced Pulmonary Tuberculosis.—Contrary reports have been published from time to time as to the presence of tubercle bacilli in the urine of tuberculosis patients in which no renal lesions were present. Two series of experiments were made in order that an opinion might be formed. In 1932 the urine of 50 patients with marked pulmonary involvement were examined. Three hundred cubic centimeters of a twenty-four-hour specimen or in some cases catheterized specimens, were centrifugated and examined microscopically and by culture. Cultures remained in the incubator for three months. With the exception of 2 cases, no acid-fast bacilli were found. In these 2 cases a rare acid-fast bacillus was found on the scrapping of the culture tube after eight days of incubation. No macrocolonies grew out. The acid-fast bacilli thus found did not tuberculize guinea pigs. In 1935 a second series of urine tests was made. The sputum and urine of 50 patients with advanced tuberculosis were examined practically simultaneously for acid-fast bacilli. Tubercle bacilli were present in the sputum of 46 patients. Sputum from the remaining 4

patients were not examined. The urine of one of these patients showed a few acid-fast bacilli on direct examination which did not grow out on culture. The remaining 49 specimens were entirely negative. In the two series, comprising 100 patients with advanced pulmonary tuberculosis, the urinary findings were totally negative for tubercle bacilli. Bacilluria is nonexistent. The presence of tubercle bacilli in the urine is indicative of renal lesions.—*Recherche de la bacillurie tuberculeuse chez 100 malades atteints de tuberculose pulmonaire très avancée mais indemnes de troubles urinaires, A. Saenz, D. Eisendrath, L. Costil and M. Sadettin, Compt. Rend. Soc. Biol., June 29, 1935, cxix, 956.—(M. T. W.)*

Acid-Fast Bacilli in Tuberculosis Patients with Normal Kidneys.—Acid-fast bacilli were searched for in the urine of 82 patients with pulmonary tuberculosis. None of these patients presented any evidence of renal lesions. In every instance the urine was clinically normal. Twenty-four-hour urine specimens were collected, shaken vigorously and 200 cc. were centrifugated at high speed. The sediments were examined microscopically and culturally for the presence of acid-fast bacilli. With one exception the examinations were entirely negative. No tubercle or paratubercle bacilli were found. The one exception, a patient gravely ill, showed acid-fast bacilli on smear of the sediment and on culture tubes. The renal function had remained normal. The patient died twenty-four hours after the specimen was collected. This was the only positive result despite the fact that no care was exercised in collecting the urines aseptically.—*Recherche des bacilles tuberculeux et paratuberculeux dans les urines des malades atteints de tuberculose pulmonaire, a reins cliniquement sains, F. Pezzangora and C. Bacanu, Compt. Rend. Soc. Biol., June 29, 1935, cxix, 954.—(M. T. W.)*

Light Therapy for Urogenital Tuberculosis.—Sinuses following the surgery of urogenital tuberculosis are of considerable importance. These sinuses usually ensue within a few weeks after the operative treatment, when, as a result of abscess formation, the incision line breaks open partially or completely. When the entire incision or a large part is involved, a deep wound is formed, which discharges pus profusely. The postoperative recovery is delayed and there is a long period of inconvenience. The author employs local irradiation with the air-cooled mercury vapor gravity lamp. Treatments are given twice each week beginning with a one minute exposure at a distance of 20 inches from the wound. The time is gradually increased to seven minutes and the distance then slowly shortened to 15 inches. The author reports on the results of irradiation of 73 cases of postoperative and inoperative urogenital tuberculosis with sinuses. The average time elapsed before healing of 41 postnephrectomy cases was 4.2 months; of 18 postepididymectomy cases, 3.7 months; and of 9 inoperable epididymal cases, 7.1 months. There seemed to be a direct relation between the time necessary for healing and the time elapsed between development of the sinus and institution of treatment. The results also are given separately of the treatment of 156 cases of postoperative and inoperable tuberculosis, all of which had quartz-light therapy in addition to other treatment, 44 of whom are apparently cured and 73 improved. The author also treated 15 patients with bladder tuberculosis with a special intrabladder applicator. While not all were benefited, there was a sufficient number of good results to substantiate the belief that therapy of this kind has its place as an adjunct to other measures.—*Quartz Light Therapy in Urogenital Tuberculosis, S. L. Wang, J. Am. M. Ass., March 2, 1935, civ, 720.—(G. L. L.)*

Nephrectomy for Renal Tuberculosis.—Tuberculosis of the kidney probably exists much more frequently than is generally conceded, a correct diagnosis in symptomless cases being often missed. In such symptomless cases, once the diagnosis is made, the question arises as to the justification of nephrectomy. There should be no hurry about operative removal of a tuberculous kidney. It is never an emergency procedure, and there can be no excuse for neglecting the most painstaking examination to be certain that the remaining kidney is not involved. If one could follow all the patients with renal tuberculosis for a certain length of time, and particularly those in whom a proper hygienic regimen could be established, the incidence of healed lesions in the kidneys would probably be somewhat astonishing. The process of prolonged watchful waiting should be insisted on in behalf of those patients in the adolescent period, as it has been agreed that younger patients are more prone to bilateral involvement than those of more advanced age, and that nephrectomy should be performed only when definite cavitation exists. The result of the renal functional test is a most excellent guide in determining the time for operation. If this remains normal, or nearly so, the disease has probably not advanced to any great degree; but a marked decrease in the amount of dye excretion, which can be

demonstrated by the intravenous urogram as well as by the color dyes, would appear to show the necessity of surgical intervention. If there is vesical irritation or other evidence of beginning tuberculous cystitis, nephrectomy is mandatory. The case, however, that gives questionable roentgenographic evidence of the disease and in which the tuberculous infection has caused so little damage as to produce but a few pus cells in the urine together with the organisms, deserves sanatorium care and observation rather than immediate nephrectomy. The authors believe in adequate hygienic treatment of renal tuberculosis in its early stage, preferably in a sanatorium. Nephrectomy should be performed only when evidence of extension of the disease exists, when caseocavernous conditions can be demonstrated, or when the renal functional test has become markedly diminished.—*Is Nephrectomy Always Indicated Following a Diagnosis of Unilateral Renal Tuberculosis? S. R. Woodruff and H. C. Bumpus, Jr., J. Am. M. Ass., March 2, 1935, civ, 716.*—(*G. L. L.*)

End-Results of Nephrectomy.—The follow-up record of 340 nephrectomies for clinically unilateral renal tuberculosis is reported. Of these 340 cases, 157 were males and 183 females. The operations were performed between 1896 and 1932. At the end of 1932, 61 per cent of the patients were living and 39 per cent had died. Of those who died, 1.7 per cent (3 males and 3 females) died shortly following operation, and 37.3 per cent (49.2 per cent of the males and 28.4 per cent of the females) died subsequently. The cause of late death was a tuberculous infection of the remaining kidney in 49.6 per cent, miliary tuberculosis in 13 per cent, phthisis in 12 per cent, other tuberculous infections (spondylitis, gastrointestinal tuberculosis, etc.) in 5 per cent, intercurrent infections in 13 per cent, contracted kidney in 5 per cent, nephritis in 4 per cent, and in 7 per cent the cause of death was undetermined. The patients who survived (207) were a heterogeneous group, with postoperative periods ranging from 30 years to 1 month. Thirty-three patients (17 males, 16 females) were operated upon between 1896 and 1905, and, of these, 14 (7 males and 7 females) were alive in 1932, that is, 43 per cent. All of these were apparently healed of their genitourinary tuberculosis. Of those on whom operation was performed between 1905 and 1912 (32 males and 38 females) 40 per cent were well, 4 per cent improved or unimproved, and 56 per cent had died. Twenty-five per cent of the survivals were males and 53 per cent females. One hundred and twenty-eight patients (63 males, 65 females) were operated upon between 1913 and 1922. Of these, 45 per cent were cured, 9 per cent improved or unimproved, and 46 per cent had died. By sexes, 35 per cent of the males were cured and 55 per cent died, while 57 per cent of the females were cured and 37 per cent died. Of 108 patients (45 males and 63 females) operated upon between 1923 and 1932, 62 per cent were cured, 24 per cent improved or unimproved, and 14 per cent had died. Of the male patients 49 per cent were cured and 22 per cent died, while 71 per cent of the females were cured and 8 per cent died. In summary, the overall probability of curing a renal tuberculosis by nephrectomy is about 50 per cent in females and about 35 per cent in males. The prognosis is therefore better in women than in men, poorer if the bladder is involved, and considerably poorer in men if a genital tuberculosis coexists. Tuberculosis of the genitalia is present in a large percentage of men, 71 per cent of 79 operated and surviving patients. Since infection of the surviving kidney occurred in 40 per cent of the males who died, and in 37 per cent of the females who died, it is probable that the presence of genital tuberculosis of the male does not play a major rôle in such reinfections.—*Bericht über 341 wegen Nierentuberkulose Nephrektomierte, F. Suter, Schw. med. Wchnschr., July, 1934, lxiv, 668.*—(*A. E. M.*)

Ureteral Transplantation from Bladder to Rectum for Tuberculous Cystitis.—Such transplantation in cases of *ectopia vesicae* or intravesical growth is well recognized but this particular *raison d'être* is thought to be unique. *Case report:* An unmarried girl of 19 gave a history of very frequent micturition, with pain and smarting. Cystoscopy showed both ureteral orifices much inflamed, especially the left, and urine from the bladder and left ureter showed pus and tubercle bacilli in small numbers, the urine from the right being normal on two examinations. Two months after first observation left nephrectomy was performed, and a small caseous focus in a single calyx was revealed. The following year, however, though improved, she was still passing tubercle bacilli in the urine and having symptoms. She went to the Papworth Colony for two months without benefit, and a later cystoscopy showed a definite tuberculosis of the right ureteral orifice with advanced bladder ulceration. Micturition occurred every twenty minutes, day and night, the patient lost about 2 stone in weight (28 pounds) and no local or drug therapy relieved her. Pennell thereupon transplanted the remaining right ureter into the sigmoid by

Coffey's second method and recovery was uneventful except for transitory vomiting. By the third day the full amount of urine was passed by rectum, which rapidly accommodated itself, and within ten days she developed a two-hourly diurnal rhythm and was only interrupted once at night. After her discharge, a month later, she soon was up and about and had gained over a stone (14 pounds) in weight. She now urinates only three or four times daily and not at all at night, and wants to resume her work as parlormaid, feeling entirely well. *Conclusions: 1:* Whether increased well-being, combined with freedom from pain, will allow her to overcome what is probably a small focus in her only kidney remains to be seen. *2:* The side-tracking of the bladder has been well worth the risk, whatever the final outcome. *3:* In spite of an only ureter transplanted through the sigmoid wall, no retained catheter was used or thought necessary. *4:* The possibility of a secondary tuberculous condition of the bowel must, of course, be borne in mind. She has no signs of it yet. *5:* The complete absence of any "abnormal" feeling in passing water, in women at least, should disabuse our minds of the present disposition to regard ureteric transplantation as a last resource.—*Transplantation of a Single Ureter as a Means of Resting a Tuberculous Bladder, V. Pennell, Brit. M. J., November 24, 1934, no. 3855, 942.*—(*A. P.*)

Addison's Disease.—Statistical studies indicate that Addison's disease is attributable to a tuberculous lesion of the suprarenal gland in about 80 per cent of cases, and that from 30 to 40 per cent of these cases are associated with tuberculosis elsewhere in the body. It was formerly believed that tuberculosis had no effect on the duration of life in Addison's disease, but, since the institution of treatment with the suprarenal cortical hormone, a considerable number of patients with Addison's disease of tuberculous origin are now surviving for periods of time beyond that usually expected and it is probable that this old point of view may have to be revised. In other words, a considerable number of tuberculosis patients, who ordinarily would have died from suprarenal insufficiency, will probably now survive long enough for tuberculosis elsewhere in the body to become a menace. Therefore, the prognosis of Addison's disease, despite the use of cortical hormone is, at best, essentially that of tuberculosis. Of 21 living patients with Addison's disease, under observation at the Mayo Clinic, 2 have recently died from tuberculosis rather than from renal insufficiency. It is therefore of increasing importance to combat any accompanying tuberculous lesions by medical and surgical means. The complicating tuberculosis of Addison's disease is, in the great majority of instances, one of the so-called "surgical types" of tuberculosis. Although it is well known that patients suffering from Addison's disease stand surgical procedures very poorly, yet surgical intervention is possible, particularly if the well-known salt deprivation and dehydration, which occur in Addison's disease, is vigorously combated preoperatively and postoperatively.—*The Changing Relations of Tuberculosis and Addison's Disease, A. M. Snell, Proc. Staff Meet., Mayo Clin., May, 1935, x, 337.*—(*A. E. M.*)

Hip Fusion Operation.—The technical difficulties involved in orthrodesis of the hip have led to the development of many ingenious operations. In the extraärticular type of operation, of which Albee's bone strut and Wilson's iliofemoroplasty are the best examples, the gap bridged by the graft is large and the grafts themselves are relatively small and weak. Even when satisfactory fusion of the graft occurs, fracture of the graft happens very frequently during weight-bearing. The important disadvantage of the combined intraärticular and extraärticular operation, of which the procedure of Henderson and Eikenbary are examples, is the lack of firm fixation during the period of fusion. Operations of the Hibbs and Ghormley type are the most satisfactory yet developed, but more rigid fixation would be desirable. The following procedure has been evolved to provide an operation that is mainly extraärticular, a substantial graft of high osteogenic power in intimate and extensive contact with both femur and ilium, a small gap to be bridged by the graft, and firm fixation until fusion has occurred. Through an adequate Smith-Petersen incision, the soft tissues are raised subperiosteally and turned out as a flap. The capsule is opened, the superior portion detached from the rim of the acetabulum and inner surface of the trochanter, and turned backward. A large strong rectangular graft is cut from the wing of the ilium immediately above the acetabulum. The superior surface of the head and neck of the femur is cut through and raised upward, the trochanter acting as a hinge. The denuded surfaces are trimmed to form a continuous surface of bare bone on to which the graft is slid downward to lie in accurate apposition throughout its length. A bone screw transfixes the upper half of the graft through the ilium to the inner cortex. The bone flap from the head and neck of the femur is

fastened to the graft by a long bone screw that transfixes the cortex of the inferior surface of the neck of the femur. A long plaster spica is maintained in place for four months. Of 22 patients, 13 to 55 years of age, upon whom this procedure was used, 16 have had solid bony fusion. One patient died of pulmonary embolus, one is still in plaster, and four are improved but fusion is not yet solid.—*Arthrodesis for Tuberculosis of the Hip, R. I. Harris, Jour. Bone & Jt. Surg., xvii (o. s. xxxiii, no. 2), April, 1935, 318.*—(*L. F. B.*)

Hip Fusion and Shelf Operation.—Modifications of Ghormley's operation are designed to establish better bony contact between the graft and its bed, both as to area of contracting surface and firmness of fixation. The graft is firmly wedged at each end into the ilium and the trochanter, and its middle section is inserted into the head and neck of the femur. If a strictly extraärticular fusion is desired, the entire graft is flared out and wedged into the ilium and trochanter only. In the shelf operation, the contacting surfaces are broader and the shelf is more like a roof and points downward. It is formed from a portion of the crest of the ilium, which is driven firmly into position under wings cut in the rim of the acetabulum. —*Hip-joint Fusion and the Shelf Operation, P. M. Girard, Jour. Bone & Jt. Surg., xvii, (o. s. xxxiii, no. 2), April, 1935, 443.*—(*L. F. B.*)

Tuberculous Meningitis with Recovery.—This patient was a girl of 14, boarder in a public school, seen at Cardiff, Wales. Her first symptoms were sore throat and fever, her temperature being 102.6°F. Five days later these symptoms had disappeared, but early the following morning she awoke with a severe headache. Later there appeared marked ptosis, especially left, and sluggish left patellar reflex, also pain in the back of the head and neck on bending the head forward. Temperature was again 102°F., and she was apathetic. A day and a half later she became semicomatose, with absent patellar reflexes. Kernig's sign was positive, and there were also pain and stiffness of the neck, extreme headache and ptosis, and some earache. Lumbar puncture revealed a clear fluid under high pressure, withdrawal of which relieved the patient markedly. The cell count was increased, with preponderance of lymphocytes and high globulin. Tubercle bacilli were found next morning in the coagulum which formed in the fluid. Improvement was steady and at the end of four weeks the patient was practically normal except for excitability. After an interval of four years she seemed completely well in every way.—*Tuberculous Meningitis with Recovery, C. L. Parry, Brit. M. J., November 10, 1934, no. 3853, 859.*—(*A. P.*)

Virulent Bovine Tubercle Bacilli in Tuberculous Meningitis.—Tubercle bacilli of a bovine strain were isolated from the cerebrospinal fluid of a child with fatal meningitis. The child had lived in the country and had not been vaccinated with *BCG*. The initial culture was dysgonic, characteristic of the bovine type. After repeated transplants the culture became eugonic, and could not be differentiated culturally from a strain of tubercle bacilli of human origin. The culture was then used for inoculations into guinea pigs, rabbits and calves for the purpose of determining the titre of its virulence. The rabbit was killed with intravenous doses of from 0.1 mgm. in twenty-five days to doses of one millionth mgm. in 145 days. Inoculations into the paw, either with 5 to 10 mgm. of emulsified bacilli or with organs from other rabbits infected with the same organism, also proved fatal to the rabbit. The guinea pig was killed with doses of from one mgm. in thirty days to one millionth mgm. in 150 days. A calf was injected intravenously with 1 mgm. and showed typical generalized visceral tuberculosis, serous throughout, at autopsy four months later. A dysgonic strain of tubercle bacilli has previously been noted by a few other observers to change into a eugonic type. This strain of tubercle bacilli, dysgonic originally, transformed into a eugonic type was very virulent for the laboratory animals as well as for the child from which it was isolated.—*Haute virulence, pour le lapin et le veau, d'une souche de bacilles bovins isolée de l'organisme d'un infant mort de méningite tuberculeuse, A. Saenz, Compt. Rend. Soc. Biol., June 15, 1935, cxix, 722.*—(*M. T. W.*)

Polymorphism of Tubercle Bacilli in Tuberculous Meningitis.—The spinal fluids from 6 cases of fatal tuberculous meningitis chosen at random were studied bacteriologically for the presence of acid-fast bacilli. From only one case were the tubercle bacilli classical on the first seeding on culture medium, producing typical R colonies. The initial cultures of two of the spinal fluids yielded granular coccoid forms, while the remaining three yielded atypical bacilli, short and thick, producing smooth yellow colonies. All of these atypical organisms recovered upon the primary culture eventually became typical, acid-fast bacilli, producing R colonies after several sub-

cultures. The spinal fluid in tuberculous meningitis does not always harbor the classical adult bacilli of Koch. Young, granular, evolutive forms may be present, illustrating the polymorphism of the tuberculous virus *in vivo.—Le virus tuberculeux dans six cas de méningite de l'adult, M. Faure-Beaulieu and C. Brun, Compt. Rend. Soc. Biol., February 16, 1935, cxviii, 657.—(M. T. W.)*

Cerebrospinal Fluid in Tuberculous Meningitis.—To obtain the maximal information from a lumbar puncture, a combination of pressure and dynamical studies, cell count, color of fluid, presence and character of clot, determinations of protein, sugar and chloride values, together with a consideration of the stage of the disease, are necessary. Although the literature on tuberculous meningitis is voluminous, most reported series of cases have been small; and this, coupled with a lack of wide experience with other conditions, has led to dogmatic statements. A comprehensive review of observations on 297 cerebrospinal fluids from 84 cases is therefore reported. In each instance the diagnosis was verified by autopsy or by the demonstration of tubercle bacilli in the fluid. The pressure of these spinal fluids varied between 35 and 800 mm. with an average of 375 mm. In only 5 per cent was the pressure greater than 600 mm. and in only 19 per cent was it less than 200 mm. With progress of the disease there was usually an increase of the pressure, although occasionally, low pressure results from the development of spinal subarachnoid block. In 8 of 11 patients with an initial pressure of less than 200 mm., in whom subsequent punctures were made, in all but one the pressure had risen to 200 mm. In most instances the fluid was clear, and nearly always a faint yellow. In fluids containing a large number of cells the appearance was that of ground-glass. A fine fibrin clot was noted in 43 per cent, although a greater percentage would probably have shown a clot if a sample of fluid had been set aside regularly for this purpose. The cell count was between 50 and 500 cells per cmm. in 85 per cent, with an average of 265, being over 500 in 9 per cent and below 50 in 6 per cent. In only 2 cases did the cells number less than 25, and in both instances the number of cells increased in subsequent punctures. In only 16 out of 141 fluids, was there a preponderance of polymorphonuclear leucocytes and in the remainder lymphocytes predominated. Polymorphonuclear cells were present in most fluids, however, averaging 20 per cent. In 94 per cent of the fluids the protein content ranged between 45 and 500 mgm. per cent, with an average of 200 mgm. per cent. In only two instances was a normal value (45 mgm. or less) obtained and in one of these the value rose to 90 mgm. on a subsequent puncture. Values over 500 mgm. were usually due to the development of subarachnoid block. Ninety-three per cent of the fluids had a sugar content of below 50 mgm. per cent, the average being 28 mgm. per cent. The highest value was 59 mgm. per cent. There is usually a progressive decrease in the sugar content as the disease advances, although this is not invariable, as the spinal-fluid sugar is influenced by the blood-sugar values and occasionally hyperglycaemias occur. Nevertheless, simultaneous determination of the plasma-sugar content, carried out in some of the cases, demonstrated that low spinal-fluid sugar values are not the result of low blood-sugar levels, but occur in spite of a normal or even an elevated blood-sugar level, indicating a local glycolysis. The chloride content was below 700 mgm. per cent in 97 per cent of the fluids and below 500 mgm. in 1 per cent. In only 3 fluids was the value above 700 mgm. per cent. Sixty-three per cent of the determinations lay between 550 and 650 mgm. per cent. There is usually a progressive decrease in the chloride level as the disease advances, although this is not invariable. The normal range of cerebrospinal-fluid chloride values in fasting patients with normal serum-chloride levels, lies between 697 and 748 mgm. per cent. In tuberculous meningitis the serum-chloride level is nearly always decreased, being below 550 mgm. per cent in 85 per cent of the cases, which is the chief reason for the lowering of the cerebrospinal-fluid chloride level. In the spinal fluids in which the colloidal gold curve was determined, a midzone curve occurred in 71 per cent. When the findings reported above were grouped according to the age of the patient, no significant differences were noted for the cerebrospinal fluid in infants, children or adults, except that the cell counts tended to be somewhat higher in the adults than in the others. The typical spinal fluid in tuberculous meningitis therefore consists of an elevation in pressure, a clear or ground-glass, colorless or faintly xanthochromic appearance, the development of a delicate weblike clot, an increase in white cells with lymphocytes predominating, an increase in the protein content, and decrease in the sugar and chloride content, and a midzone reaction in the colloidal gold test, or no reaction at all. This typical syndrome may occasionally be absent, especially if a puncture is done early in the disease, but subsequent punctures will nearly always show the typical changes. Exceptions to the complete formula may be

found in one, but rarely in several of the tests. In the presence of a low cell count, determination of the protein, sugar and chloride may, nevertheless, make diagnosis possible before the cell count has become elevated. While either the cell count or the protein content may occasionally be normal, in no instance were both these values normal. A simultaneous estimation of blood-sugar and spinal-fluid sugar often helps to decide the significance of border-line values. The typical formula for the cerebrospinal fluid outlined above is nearly pathognomonic of the disease. The only other condition which may completely simulate these findings is yeast meningitis, which is fortunately rare, and which can only be distinguished by finding the organism in smear or culture. Spinal epidural abscess, due to *Staphylococcus pyogenous aureus* may show a fluid resembling that of tuberculous meningitis, but a spinal subarachnoid block is nearly always present from the onset, while in tuberculous meningitis block is usually a late complication. Acute syphilitic meningitis may also give real difficulty in differential diagnosis, since the Wassermann reaction may occasionally be negative. In this situation the chloride values are helpful, for in syphilitic meningitis the average value is 691 mgm. per cent and chloride values of 600 mgm. per cent or less are a strong point against the diagnosis of syphilis. A colloidal gold reaction is of help here too, for a first zone curve occurs in 42 per cent of acute syphilitic meningitis, while it occurred in only 2.5 per cent of tuberculous meningitis. Of all the other conditions which may clinically simulate tuberculous meningitis, definite distinctions may be found in the spinal fluid findings. In the early stages of acute anterior poliomyelitis the sugar and chloride values are normal or high and in benign lymphocytic meningitis the sugar content is normal or increased, and the chloride content is normal or only slightly reduced. It is concluded that although no hard and fast rules can be made for any single constituent in the cerebrospinal fluid, it is possible, by grouping the data obtained from several tests, to establish cerebrospinal fluid syndromes of diagnostic value, and the syndrome of tuberculous meningitis is a highly characteristic one which rarely occurs in any other disease.—*Cerebrospinal Fluid in Tuberculous Meningitis, H. H. Merritt and F. Fremont-Smith, Arch. Neurol & Psychiatr., March, 1935, xxxiii, 516.*—(*M. T. W.*)

Multiple Tuberculous Abscess of Brain.—A 46-year-old Japanese male, who had been successfully operated upon for a tuberculous granuloma, involving the caecum and adjacent structures, died following a syndrome, which suggested an expanding lesion of the right cerebellar lobe. On postmortem examination multiple encapsulated abscesses were found scattered through the brain. Although these abscesses, grossly and histologically, resembled those resulting from pyogenic organisms, tubercle bacilli were demonstrated as the causative agent. No granulomatous or tubercle-formation was present. Although the central nervous system is not infrequently invaded by tuberculosis, this usually occurs as a tuberculous meningitis, miliary tuberculosis, or less frequently as single or multiple tuberculomata. True tuberculous abscesses, such as this patient presented, are very rare and only two similar instances were found reported in the literature. The process of formation is apparently the same as that of an ordinary blood-borne pyogenic abscess.—*Tuberculous Abscesses of the Brain Secondary to Tuberculosis of the Caecum, C. W. Rand, S. G. O., February, 1935, lx, 229.*—(*A. E. M.*)

Blood Cultures in Tuberculosis Cutis and Tuberculides.—The pathogenicity of the tuberculides is ever a controversial point in dermatology. An hypothesis almost discarded is that the toxituberculides are due to a toxic tuberculosis. On the other hand, the theory that the tuberculides are infections caused by a few bacilli or attentuated or dead bacilli has many firm upholders. But the actual question is, do tuberculides result from dead or attentuated tubercle bacilli, or are they due to a filterable form of the tuberculous virus? The partisans of the latter theory base their belief on the results of animal inoculations of the tissues or blood of patients with tuberculides. The animals develop an infection analagous to an infection resulting from inoculations of a filterable form of the tuberculous virus, a type of tuberculosis characterized by enlarged lymph nodes only, in which tubercle bacilli are demonstrable and without caseous lesions or lesions at the site of inoculation (type Calmette-Valtis). Inoculations of blood or tissue fragments with successive reinoculations are made from guinea pig to guinea pig of the spleen, liver and lymph nodes. A control animal is always observed simultaneously. Ravaut obtained some interesting results by inoculations of tissue fragments from tuberculides as well as blood. Out of 34 cases he obtained 14 tuberculous infections of the type Calmette-Valtis. He concludes that tuberculides are the result of a tuberculous septicaemia by a filterable form of the tubercle virus while classic *tuberculosis cutis* is a result of an infection of an adult tubercle bacillus. Stimulated by these results, inocu-

lations of blood in series were made in 21 cases of cutaneous tuberculosis or tuberculides, 7 cases of true *tuberculosis cutis* and 14 cases of various types of tuberculides. All these cases presented skin lesions only, without clinical or roentgenological evidence of any other localized tuberculosis. The technique used was that of Ravaut employing inoculations of blood with successive reinoculations. Out of the 21 cases there were three positive results; one case of nodular lupus and another case of Bazin's disease showed experimental tuberculosis (Villemin type), while the third, a case of *lupus exanthematosis* showed an inoculation tuberculosis of the type Calmette-Valtis. In several cases hypertrophied lymph nodes were found in the animals but without detecting acid-fast bacilli in the tissues. The authors believe that the finding of tubercle bacilli is an indispensable criterion for calling an inoculation positive. Under these circumstances only 3 cases were found to be positive out of the twenty-one. A few concluding commentaries are made, but no conclusions can be drawn. With such limited experimentation it is only possible to remark that the results support but feebly an argument in favor of the rôle, in *tuberculosis cutis* and the tuberculides, of tuberculous septicaemia either of an adult bacillus of Koch or a filterable form.—*Résultats fournis par les inoculations de sang en série au cobaye dans la tuberculose cutanée et les tuberculides, J. Gaté, P. J. Michel and P. Dugois, Compt. Rend. Soc. Biol., May 20, 1935, cxix, 595.*—*(M. T. W.)*

Treatment of Pulmonary Tuberculosis.—A tentative working classification of treatment in pulmonary tuberculosis is given for the physician either in the sanatorium or on the outside. In the truly minimal stage where the infiltration (always without cavitation) does not extend below the level of the second chrondrosternal junction, if unilateral, or below the clavicle, if bilateral, no surgical intervention is done unless it is indicated by a subsequent roentgenogram. If the patient has been allowed up he is now confined to bed; if already under rest treatment surgery must be employed. In such patients, especially when there is some indication of pulmonary contraction, crushing of the phrenic nerve may be all that is required. Artificial pneumothorax may be also considered. Colored patients with minimal disease are given bed-rest for one month and, if the second roentgenogram shows any increase, artificial pneumothorax is done. Patients having moderately advanced proliferative lesions without cavity can usually be safely treated somewhat longer without resort to surgical interference. If the lesion appears stationary after two or three months, the symptoms are the deciding factor as to whether or not temporary phrenic operation is to be employed. When the lesion is progressive in spite of rest treatment this operation should be used for cases having the more limited lesions, pneumothorax for most of the cases, and thoracoplasty for those in which other treatments fail. Patients having moderately advanced lesions with cavity (never more than 4 cm. in diameter), and not extending below the 3rd rib are watched carefully, but not given surgical treatment in retrogressing lesions unless a cavity persists. In stationary disease with symptoms slight or absent the patients are watched carefully for 2 or 3 months, but, if symptoms or tubercle bacilli increase, active surgical treatment is necessary, as would be the case if the lesion were progressive at first. Phrenic operation (with or without scaleniotomy) is used for the smaller, earlier, thin-walled cavities. The others are given pneumothorax and, failing in these measures, thoracoplasty is done. As soon as the lesion extends below the 3rd rib (usually meaning that more than one lobe is involved), the situation becomes much more serious and active surgical treatment is demanded earlier and upon slighter symptoms. Patients in the far-advanced proliferative stage without cavitation usually require no surgical treatment except for displaced viscera, when phrenic operation may relieve the situation. In this stage and with cavitation, surgical treatment may be demanded even when the disease is retrogressive. Phrenic operation may be done. However, these are the favorable type of case for thoracoplasty but pneumothorax should always be tried first. All patients with exudative lesions should be considered to be in a more serious, a rapidly changing and a more acute condition, and therefore must be watched more closely. All negro patients and young white patients, especially girls, between 12 and 19 years are always treated as having the exudative type of tuberculosis. Artificial pneumothorax is the best treatment. Phrenic operation is often of little aid. If these are of no avail, thoracoplasty must be considered in unilateral cases when the patients are in good general condition, having been ill, and confined to bed but a short time. Even retrogressing and more particularly apparently stationary lesions should not be trusted without surgical treatment. While this holds for the moderately advanced stage, the only hope for the far-advanced exudative group lies in artificial pneumothorax. Intra-

pleural pneumonolysis must be considered in all cases of incomplete pneumothorax.—*A Tentative Working Classification to Facilitate the Treatment of Pulmonary Tuberculosis, L. Brown and H. L. Sampson, Am. J. M. Sc., March, 1935, clxxxix, 325.*—(*E. M. J.*)

Care of Advanced Consumptive.—Any case in which the outlook is immediately or remotely hopeless, regardless of the rate of progress, is considered advanced. Since about 37,000 people die annually of pulmonary tuberculosis we may conclude that there are at least that many advanced cases at present who need care and treatment. They should not remain in overcrowded conditions, especially if children are present, nor all be sent to one particular hospital. They should not remain for prolonged periods in an institution, if home conditions are satisfactory, occupying beds that can be used by hopeful cases. They should not be allowed to degenerate mentally by enforced idleness. In the absence of children, under proper conditions the adult advanced case can be cared for at home. The careless ambulant patient is a greater danger to the community than the bedridden one because he can distribute tubercle bacilli over a much wider area. If the case is immediately hopeless he should probably be allowed to remain at home if conditions are suitable. If home conditions are not suitable the patient may be sent to the hospital nearest his home where there are other tuberculosis cases of all stages. If the patient has a fair prospect of life, a limited stay in a tuberculosis hospital is desirable. Here he can be educated, given such palliative treatment as desirable and instructed in some form of light suitable handicraft. If home conditions are unsuitable he can then be sent to a home in the country where he can continue his handicraft until such time as he needs more detailed attention. In this type of case it is important to give the patient the opportunity to produce something. The sentimental and financial side of the problem should not be lost sight of particularly with reference to the relatives of the patient.—*The Care of the Advanced Consumptive, F. R. G. Heaf, Jour. St. Med., March, 1935, xliii, 182.*—(*L. F. B.*)

Major Surgical Treatment of Pulmonary Tuberculosis. — Institutional treatment has played a very prominent part in the management of cases of pulmonary tuberculosis for the last forty years. But, while sanatoria have been regarded as places for the treatment of phthisical patients whose prognosis is good, until recent years little or no provision has been made for the advanced case or the one requiring prolonged bed-rest and careful nursing. It has been too much stressed that advanced cases should be segregated, often in local institutions or "homes," which are unpopular with both patients and medical staff, both of whom dislike the atmosphere of a place devoid of hope, where the patients slowly fade away, meanwhile brooding over their misfortunes and producing a daily crop of grumbles. Quite a large proportion of patients with extensive disease, however, find their way into sanatoria, partly owing to lack of early symptoms, partly to their desire to escape the home for the dying, and partly owing to the inadequate provisions for cases not hopeless but whose chances of recovery demand prolonged bed-rest. It has been found that the bogey of feared depression because of mixing advanced and early cases does not exist and that increasing the number of bed-patients does not affect the cheerfulness of atmosphere, although it does raise the serious problem of providing necessary and suitable accommodations and is a constant administrative trial. It has proved more practical to segregate patients according to the kind of treatment required than according to the extent of their lesions, the sanatorium providing mainly routine rest and hygienic treatment, special chemotherapy (*e.g.*, sanocrysin) and minor collapse therapy measures, such as pneumothorax, phrenicectomy, etc., while the tuberculosis hospital or special departments of the municipal or general public hospital accommodate those requiring major surgical treatment, observation and prolonged bed-rest. It is both unnecessary and uneconomical to send such patients far from home into a distant country location. Bed-cases of this type require large and well-trained staffs, which are difficult to obtain and keep in areas remote from towns. Also, careful observation demands a full and complete examination with the assistance of expert radiologists, pathologists and others as occasions arise, acting in collaboration with the tuberculosis officer or physician in charge. *Surgical treatment:* The extensive application of surgical measures poses important problems, and demands, first, the services of a surgeon with special experience assisted by a trained staff conversant with the postoperative care and nursing, also a specially equipped theatre and operating room involving considerable expense. Extremely careful selection is important for good results and this again necessitates a modern X-ray plant and pathological laboratory. Because, according to Heaf's estimate, less than 2 per cent of patients are suitable for major surgery, isolated attempts at

progress in small areas with insufficient material are unwarranted. At Brompton Hospital, of 1,280 cases of pulmonary tuberculosis in 1932, only 47 stage-1, 44 stage-2, and 5 stage-3 thoracoplasties and 6 apicolyses were carried out, while at Colindale (London County Council) where all cases are scrutinized with a view to possible surgery, only 6 thoracoplasties and 3 apicolyses were performed among 752 admissions during 1933. Considering this, it would seem that the problem of providing major surgical treatment such as thoracoplasty, apicolysis and section of adhesions, is not an easy one for the councils responsible for the care of the phthisical patients. It would seem best for all concerned that the patient be near to the surgeon throughout the period of operation and postoperative observation. This usually means in a hospital in or near a large town and not in the country sanatorium. Even if the medical superintendent or one of the resident staff is qualified and capable, it is doubtful if he will obtain sufficient practice to improve his technique and the small number of cases operated on means a high unit cost for upkeep, material and extra staff. Moreover, the maintenance of a hopeful optimistic sanatorium environment does not fit in with drastic treatment by extensive surgery. A hospital, with its greater number of bed-cases, more frequent use of the operating theatre, and of all types of special therapy, sets up a state of mind in the patient that is more conducive to major surgery and to recognition of the seriousness of his disease. To be kept busy, a thoracic surgery centre must serve a large area, be accessible, and possess a surgeon specially trained in this work. In provincial districts, several counties must arrange to send their cases to a properly staffed and equipped hospital in or near a conveniently situated large town. Only large municipal boroughs will have sufficient cases to justify setting aside part of their general hospital for this work. For postoperative convalescence the country sanatorium is the ideal place. The memorandum submitted to the Ministry of Health Departmental Committee by the Society of Medical Officers of Health in July, 1934, issued a statement regarding requirements for institutions for residential treatment of tuberculosis which is open to varying interpretations and would appear to suggest that every such institution should maintain fully equipped and adequately staffed facilities for every mode of diagnosis and therapy. It seems hardly possible that such lavish expenditure as would be needed was contemplated for the whole idea of turning the country sanatorium into a hospital is difficult and costly. True, every town-dweller benefits from sojourn in the country, yet it is quite unnecessary to transport him into the wilds for operative treatment, merely because he is tuberculous. Moreover, nobody can at present foretell the future of thoracoplastic surgery in tuberculosis, surgeons differing widely in judgment as to technique and indications. One ought to proceed cautiously when artificial pneumothorax fails and one must still rely on the individual responses to the toxiinfective process. It is, however, proposed that hospitals and sanatoria be established or maintained for all diseases of the chest (lungs in particular), the sanatoria doing minor surgery and receiving cases from the hospitals to convalesce in the country. The tuberculosis officer would then become a chest specialist working in close coöperation with the medical superintendent of the chest-hospital and controlling centres for artificial pneumothorax refills and observation, which are at present inadequate. Thus, the limited future of the tuberculosis worker would be broadened, and practice made more attractive, while the patients would be less stigmatized. The Brompton Hospital for Diseases of the Chest is an excellent model for the chest-hospital. The tuberculosis dispensary would also be modernized and converted into a chest-clinic, completely equipped for diagnosis and ambulant forms of treatment, as well as observation and follow-up. This is far more to be desired than the multiplication of centres for thoracic surgery. The progress of antituberculosis work is now hindered by poor facilities in many instances and pneumothorax patients are handicapped after their discharge by having to travel long distances for refills, often carried out in out-patient departments by junior internes with insufficient experience to appreciate important details. Medical students would also receive a better balanced course of instruction and training than at present.—*The Provision for Major Surgical Treatment of Pulmonary Tuberculosis, F. Heaf, Brit. M. J., January 5, 1935, no. 3861, 8.*—(*A. P.*)

Treatment of Haemoptysis.—It is well for a physician when called to attend a patient spitting blood to inquire if there is a history of pulmonary tuberculosis or other conditions known to cause haemoptysis, such as mitral stenosis and bronchiectasis and also to recall the possibility of ruptured aortic aneurysm, with severe and fatal results. The chest should then be examined by inspection, palpation and auscultation but not by percussion. The heart should be examined for evidence of mitral stenosis. It should also be recalled that in early pul-

monary tuberculosis physical signs may not be evident nor is it always possible to decide which is the bleeding side, though the patient's subjective sensations are of some assistance. *Pulmonary tuberculosis:* In all cases the patient should go to bed until bleeding has stopped, and a morning and evening temperature and pulse-rate taken. Determination of the erythrocyte sedimentation rate will also give valuable indications of activity. While bleeding continues all food must be served cold, and should be mostly soft with fluids restricted to two pints in twenty-four hours. Administration of magnesium sulphate every other morning, 2 drams in 2 ounces water, is recommended, and calcium in some form 3 times a day for several months. The patient should be warned against direct exposure of the body to the sun and should sit in the shade outdoors. Haemoptyses seem to be more common during heat waves. *1: Moderately severe cases:* Here the temperature is usually elevated and the lesion presumably active. Tubercle bacilli may be found in the blood-stained sputum. The patient should be in a semirecumbent position in bed, on two pillows, turned slightly toward the bleeding side. He must be kept absolutely quiet, with no visitors, and not allowed to do for himself. Morphine sulphate, gr. $\frac{1}{4}$, should be given subcutaneously and a little ice allowed to be sucked. Collosol calcium (Crookes) may be given intravenously in doses of 1 cc. daily and 20 cc. Coagulen (Ciba) by subcutaneous injection twice the first day. The morphine may be repeated at six-hour intervals, not more than 1 grain in twenty-four hours because of its depressant effect on the cough reflex. Coagulen, in doses of 1.5 cc., may be repeated daily for a week and in some cases 1 grain of emetine hydrochloride by intramuscular injection daily for 12 doses seemed valuable. *2: Severe cases:* Artificial pneumothorax is most effective when it can be induced successfully to collapse the bleeding area. About 500 to 800 cc. are usually required to check a severe haemoptysis. Where an artery wall has eroded into a cavity no known treatment will arrest the haemorrhage and the patient dies swiftly often without expectorating much blood. *Mitral stenosis:* The cause of bleeding is generally a pulmonary thrombosis rather than passive congestion. The patient should be put to bed and, if auricular fibrillation or tachycardia exists, digitalis should be given sufficient to reduce the rate to about 80 per minute, either as the tincture, tablets of the whole leaf, or Nativelle's granules. Six-hour intervals are best and, if the dose is large, it is wise to count the apex-rate before each dose.—*The Treatment of Haemoptysis, G. E. Beaumont, British M. J., January 8, 1935, no. 3861, 25.*—(*A. P.*)

Pulmonary Collapse and Thyroid Gland.—It is recently contended that all patients with hyperfunctioning thyroid glands are anoxaemic. Since tracheal stenosis produces colloid goitre because of the anoxaemia this group of experiments was designed to show the effects of a large pneumothorax or oleothorax upon the thyroid. Oleothorax was employed more than pneumothorax because refilling was unnecessary. The production of pulmonary collapse in 26 puppies showed no increase in colloid in the thyroid after 1 week, in 3 there was some colloid production after 2 weeks, and in 5 no change. In 5 dogs collapse was continued for 3 weeks. In 2 of these there was an increased production of colloid. In a series of 11 adult animals no change in the thyroid gland was obtained by pulmonary collapse. In a series of 22 kittens 4 showed some evidence of increased colloid production after collapse of 1 week. Pulmonary collapse produced no effect upon the thyroid-gland colloid content in adult animals. There was some increase in colloid in 31.2 per cent of the puppies and in 57.1 per cent of the kittens in one week and 87.4 per cent after 2 weeks.—*Effect of Pneumothorax and Oleothorax on the Histologic Structure of the Thyroid Gland, A. C. Abbot, A. M. Goodwin, Sara Meltzer and E. Stephenson, Arch. Surg., April, 1935, xxx, 667.*—(*J. F. B.*)

New Operation for Tuberculous Empyema.—The drainage of tuberculous empyemata by the ordinary form of rib-resection, with the introduction of a drainage tube, and open or closed drainage, is notoriously unsatisfactory, especially in those not secondarily infected. Aspiration by syringe and replacement of the pus by an equal quantity of air, oleothorax, and irrigation of the pyopneumothorax cavity with various antiseptic solutions have yielded equivocal results. Extensive thoracoplasty may succeed in obliterating the empyema cavity, but many patients are not sufficiently good risks for this formidable and extensive operation. Since some forms of tuberculous empyema, even purely tuberculous ones, produce such consistently high temperatures and such severe symptoms of toxicity that drainage seems imperative, a desire to institute drainage without a drainage tube, which, in itself, probably tends to keep up fever and sepsis, led to the following operation, which has proved of use in secondarily and nonsecondarily infected tuberculous empyemata: Under local anaesthesia a

U-shaped flap of skin and subcutis is outlined about halfway between the posterior axillary line and the line of the superior scapular angle. The flap has a base about 2 inches wide, about one rib higher than the bottom of the empyema cavity, and is about 2½ inches long, so that it reaches into the pleural cavity without the least tension, and therefore should be longer in fat patients than in lean ones. The rib underlying the top of the flap is resected equal in width to that of the flap. The rib is stripped with a cautery rather than with a raspatory and the bared intercostal nerve injected with absolute alcohol. The tip of the flap is turned into the chest and tacked to the pleura with one or two chromic catgut stitches. The edges of the defect in the skin are approximated with a few stitches of silkworm. This thoracotomy has a valve action, and, with each cough or rise in intrapulmonary air-pressure, air is expelled from the thorax and the lung expands. The thoracotomy remains open until the lung reaches the chest-wall, after which it spontaneously closes. This operation is therefore not applicable in any instances in which expansion of the lung to any degree is inadvisable.—*An Operation for Tuberculous Empyema, L. Eloesser, S. G. O., June, 1935, lx, 1096.*—(*A. E. M.*)

Physiological Pathology of Bilateral Pneumothorax.—The rationale of simultaneous bilateral pneumothorax lies in the therapeutic action of *hypotensive* pneumothorax in contradistinction to the classical *compressive* pneumothorax of Forlanini. It is generally believed that the insufflation of gas into a pleural cavity is followed by a more or less marked limitation of respiratory movements in the corresponding lung, and wider compensatory excursions of the opposite lung. Actually, however, respiratory excursions take place on both sides of a median pulmonary elastic tension, the so-called intermediate position of Bohr, and when gas in moderate quantities is introduced into a pleural cavity, Bohr's mean is lessened at the expense of the reserve air. If the mediastinum is movable, the contralateral lung is more or less compressed until the mediastinum has reached the limit of its physiological mobility. As long as the visceral pleura is in contact with the parietal pleura, the lung is obliged to follow completely the movements of the thoracic cage. The respiratory movements, therefore, affect the healthy and diseased areas equally, the more distensible as well as the less distensible, the latter, therefore, being subject to greater strain and traumatism. As soon as gas is introduced into the pleural cavity, the lung is no longer obliged to closely follow the movements of the thoracic cage and the less distensible infiltrated areas expand less than the more distensible healthy areas, and so are assured a relative degree of rest. Furthermore, the sudden increases in pressure which take place with each attack of coughing, provoke the expulsion of a certain amount of air and exudation, and the inspiration following this does not reëxpand these infiltrated and less distensible areas to the same degree as the healthy ones and elective collapse ensues. The fundamental elements in homolateral hypotensive pneumothorax are therefore (1) the elimination of respiratory traumatism; (2) the utilization of the differences in elasticity between the healthy and diseased areas; and (3) elective collapse. The indications for bilateral pneumothorax fall into two main classes (1) if, in a monolateral pneumothorax, the opposite lung does not show any clear signs of improvement or a fresh evolution becomes manifest in the opposite side, and (2) in bilateral lobitis of the apices, in circumscribed, bilateral ulcerocaseous tuberculosis and especially in incipient bilateral infiltrations. An analysis of the end-results of bilateral-collapse therapy reported by various authors, warrants the conclusion that simultaneous bilateral pneumothorax in the treatment of tuberculosis has come to stay. For the present, its application should be confined to institutions properly equipped and it should be carried out only by medical men familiar with all the details and intricacies of artificial pneumothorax.—*The Physio-Pathology of Simultaneous Bilateral Pneumothorax, A. M. Cholette, Canad. M. A. J., July, 1935, xxxiii, 67.*—(*A. E. M.*)

Artificial Pneumothorax Treatment of Exudative Pleurisy.—All pleurisies with effusions are treated by withdrawing the fluid and applying pneumothorax for six months. At the end of this period an X-ray of the chest is taken to determine the conditions of the lungs. If there are no tuberculous lesions, the treatment is stopped. If there are lesions, it is continued.—*Pneumotórax como tratamiento de las pleuresias con derrame, M. E. Galarza, Rev. Med. Peruana, August, 1934, vi, 1941.*—(*J. R. P.*)

Prevention of Pleuritis in Artificial Pneumothorax.—Following the advice of W. Unverricht, sterile olive oil was injected into the pleural cavity of rabbits; and afterward an artificial pneumothorax was performed and continued. The results showed that following the injection of oil fibroblastic proliferation of the pleura increases the local immunity against infection.

For the last two years, Unverricht introduced oil into the pleural cavity of all patients treated with pneumothorax. In 105 cases the second or third refill was combined with the injection of 2 to 4 cc. of sterile olive oil into the pleural cavity. The day following the injection, most of the patients showed tenderness and elevation of temperature, which lasted for a few days. All these cases presented, roentgenologically, fluid in the costophrenic angle; in 4 cases the exudate reached to the level of the diaphragmatic dome. In 14 days the fluid was resorbed. The maximum degree of the pneumothorax should be reached not until fifteen days after the injection of oil. The method of Unverricht as a preventive agent of pleural effusions in cases of an artificial pneumothorax is recommended.—*Über Pneumothoraxpleuritis und eine einfache und wirksame Methode ihrer Vermeidung, I. Petrin, Ztschr. f. Tuberk., May, 1935, lxxiii, 31.*—(*F. G. K.*)

Reëstablished Artificial Pneumothorax.—In 14 cases of abandoned pneumothorax, treated at the Agra Sanatorium, a renewed attempt at pneumothorax was made. In 8 cases the attempt succeeded, and a satisfactory collapse was obtained in three of these 8 cases. In 2 cases there was definite failure. The impression is gained that in cases with exudative foci, such as early infiltrates, with high allergy and with elevation of temperature, repeated pneumothorax succeeds more often than in cases with chronic productive fibrosis. For practical purposes these findings suggest the attempt of a second pneumothorax in all cases of reëstablished tuberculosis, following a previous successful treatment. Repeated pneumothorax should precede all other surgical procedures, which are only indicated if the reëstablishment of a pneumothorax fails. Pneumothorax should be continued by all means as long as possible, and should not be abandoned prematurely, not even in cases that require a contralateral pneumothorax. In order to avoid organization and thickening of pleural effusions, often repeated X-ray examinations are recommended, in order that the proper time for refills as a substitution of the fluid by gas may so be indicated. Since the absorption of such effusions is sometimes very slow, and since the fluid may shift upward and become encapsulated, the maintenance of pneumothorax ensures proper pulmonary collapse.—*Grundsätzliches zur Pneumothoraxbehandlung, K. Veiel, Ztschr. f. Tuberk., April, 1935, lxxii, 321.*—(*F. G. K.*)

Pleuropulmonary Retraction after Artificial Pneumothorax.—The evolution of the pleuropulmonary retractions occurring after artificial pneumothorax is not always as favorable as many authors would lead us to believe. It depends, above all, on the nature of the lesions that are responsible for the retraction. When due to fibrous pleurisies, these retractile processes have a good prognosis. When the retraction is due to extensive fibrosis of the pulmonary parenchyma, with persistence of exudative foci and anatomical and functional changes in the bronchial system, and with tubercle bacilli in the sputum, the evolution of the process may be unfavorable. Any patient presenting pleuropulmonary retraction following artificial pneumothorax should be subjected to a detailed and prolonged clinical, radiological and bronchographic observation before establishing the prognosis. Four cases of pachypleuritis with retraction are presented, with clinical recovery after 4, 8, 5 and 6 years; 6 cases of retraction due to fibrothorax, with parenchymal involvement predominating, were worse after one to four years. When the retraction is due to pulmonary atelectasis, the prognosis depends on whether the sclerosis is predominantly pleural or parenchymatous.—*Las retracciones hemitorácicas en el curso del neumotórax, A. Sarno and R. P. Blanco, Rev. Tuberc. Uruguay, 1934, iv, 103.*—(*J. R. P.*)

Force of Gravity on Pneumothorax.—Normally the lung is held against the chestwall by the atmospheric pressure present in the lung and the pull on the apex is only slightly greater than that at the diaphragm. Gravity exerts its full force in pneumothorax, the lung being pulled downward and inward by its own weight, the lobes separating from each other. The lung is fully movable with changes in posture. The movable portion may exert a pull on adhesions, especially with forced respiration and changes in position, causing cavities to enlarge torsion of blood vessels or tears in the lung. Large areas of atelectasis may occur, due to kinking of one of the large bronchi. This is frequently true of an upper lobe, more commonly the left, especially if there is consolidation or a cavity filled with blood or pus in that lobe. Such an atelectasis may prevent reëxpansion because of fibrosis, but reëxpansion usually occurs following complete pneumothorax. The ball-valve action of an incompletely obstructed bronchus may produce an obstructed emphysema. Enlargement of cavities may occur in the same manner when pneumothorax is started. With a change in position the cavity may decrease its size due to straightening of the bronchus. The so called selective collapse is an illu-

sion, for the X-ray findings are the result of the laws of inertia and gravity, the lung sinking to the bottom and the air rising to the top. Seldom, if ever, does a selective collapse occur at the base. The conclusions are that (1) under normal conditions gravity has little effect and excess stretching is prevented by the heart and abdominal viscera, but in pneumothorax gravity is given full play, the lung sinking to the bottom, sometimes tearing adhesions; (2) the lung can move about freely in the pneumothorax cavity with changes in position and selective collapse; (3) the weight of the lung may cause kinking of a bronchus producing atelectasis, emphysema, or enlargement of cavities, depending upon the degree of occlusion.—*The Rôle of the Force of Gravity in the Pneumothorax Cavity, E. Korol, Radiol., May, 1935, xxiv, 550.—(G. F. M.)*

Injection of Alcohol into Phrenic Nerve.—The injection of alcohol into the phrenic nerve achieves the purposes of phrenicoexairesis with much less traumatism, less liability to rupture of blood-vessels or of the pleura, and less opportunity for the lighting up of a focus in the contralateral lung. Since its effect is transitory, it can be used in cases in which there is suspicion of involvement of the opposite lung. Once the paralyzing effect of the alcohol has ceased, surgical intervention in the opposite lung can be effected if necessary. The injection of 1 cc. of absolute alcohol into the nerve is considered sufficient to paralyze the hemidiaphragm for over six months. In some cases the paralysis has lasted for as long as three years. The technique of the operation is equal to that of phrenicectomy, until the nerve is uncovered and identified. Then the nerve is anaesthetized with novocain, to avoid neuralgic pains. The alcohol should be injected well within the nerve, along different points, over an extension of from 3 to 5 centimeters. After injecting the alcohol, the surgical field should be washed with tepid physiological salt solution to avoid the irritation of the tissues that might result from the spilling of alcohol. Alcoholization will probably in the future substitute phrenicectomy in those cases in which the latter operation is indicated. According to Rautureau, the injection of alcohol into the phrenic nerve should be preferred to phrenicectomy in unilateral lesions of the apex which are recent and circumscribed, and in combination with other methods of collapse therapy in bilateral tuberculosis. Also, in addition to pneumothorax where the base of the lung tends to reëxpand because of diaphragmatic hypertonicity.—*La freni-alcoholización en el tratamiento de la tuberculosis pulmonar, A. Renzo, H. Nelson and S. DeRezende, Rev. d. Tuberc. Uruguay, October, 1934, iv, 71.—(J. R. P.)*

Phrenic Paralysis and Interposition of Colon.—In a series of 141 cases of right-phrenic-nerve paralysis, of which 53 had pneumothorax also, there were only two occurrences of interposition of the colon. In one case the condition was temporary and was present before pneumothorax was induced. In the other case, phrenicectomy was added to the continued pneumothorax, and roentgenograms showed that, within two days, a portion of the colon had become permanently lodged within the vacated phrenic vault. There were no symptoms referable to the right hypochondriac region. In differential diagnosis it was possible to rule out: *1:* Part of pneumothorax by tracing the contour of the collapsed lobes. *2:* Pneumoperitoneum by haustrations in the rarefied area, barium enema, no air in the contralateral subphrenic vault, and no variation in volume of air between refills. *3:* Subphrenic gas-abscess by lack of septic clinical course. *4:* A diaphragmatic hernia by an intact diaphragmatic contour. The interposed loop had the haustral segmentation of the ascending colon. The transverse colon seemed shortened. No treatment is indicated unless incarceration makes surgical intervention necessary. Probable factors in the aetiology of interposition are (1) loss on contraction of the diaphragm which resists the encroaching colon; (2) artificial pneumothorax which, by compromising the elastic pull of the lung, weakens the contact between liver and diaphragm; and (3) elongation of the colon.—*Interposition of the Colon Following Induced Phrenic Paralysis, P. Slavin, Am. J. Roentgenol., April, 1935, xxxiii, 480.—(E. M. J.)*

Phrenic-Nerve Interruption.—In 68 cases of tuberculosis treated with phrenicectomy, there were 9 cured, 9 dead; and 50 still showed some minor changes more or less active. These cases show that the superior indication of a phrenicectomy is given by the presence of single cavities. There is also marked improvement in cases with lobar infiltrations, including multiple cavities of subacute character and with pleural changes. Phrenicectomy is contraindicated in cases with large apical cavities, with acute lobar or marginal pneumonic infiltrations. Otherwise, diffuse infiltrations involving one lobe or even an entire lung seem to improve and may become arrested. In comparison with phrenicectomy, the results of alcoholization of the

nerve shows the same effect, but it is impossible to predict how long the paralysis will last. The paretic periods vary between two and eighteen months. Reactivations are reported following the restitution of the diaphragmatic action.—*Résultats thérapeutiques des interventions chirurgicales sur le phrénique dans la tuberculose pulmonaire, E. Sergent and C. Launay, Arch., Méd. Chir. l'App. Resp., 1934, ix, 44.*—(*F. G. K.*)

Phrenic-Nerve Interruption in Suppuration of Lung.—In 25 cases of putrid bronchitis in the lower lobe 8 showed a transient, 4 a persisting amelioration, 2 definite improvement, 9 no influence at all; and 2 became worse, following induced diaphragmatic paralysis. The best results follow in cases with cylindrical dilatations of low-grade infection, originating in childhood, which are not or only slightly foetid and present no symptoms of peribronchial pneumonia. Phrenicectomy performed in 11 cases of pulmonary suppurations yielded only one improvement, 4 transient amelioration, and 6 cases were aggravated. In the latter cases there was also sometimes as an immediate result a decrease in the amount of sputum, which is rather a symptom of insufficient draining of the cavity than a proof of amelioration.—*Résultats thérapeutiques des interventions chirurgicales sur le phrénique dans les suppurations bronchopulmonaires, E. Sergent and R. Kourilsky, Arch. Méd. Chir. l'App. Resp., 1934, ix, 49.*—(*F. G. K.*)

Phrenicectomy for Persistent Haemoptysis.—Diaphragmatic paralysis is indicated in cases showing fibrous caseous changes and presenting haemoptysis which is resistant against conservative procedures. There is also sometimes an effect on cases with pneumothorax which fails to control haemoptysis. In cases with cavities good results were not obtained. The haemostatic effect of phrenicectomy is attributed to mechanical influences.—*Sur le traitment des hémoptysies rébelles par la phrénicectomie, J. Minet and J. Dupire, Progr. Méd., January 19, 1935, 97.*—(*F. G. K.*)

Intrapleural Pneumolysis.—The most to be expected from this procedure is to improve pulmonary collapse by artificial pneumothorax when it is hindered by pleural adhesions and occasionally to relieve distress due to tension in these. In 1932 and 1933, of 750 sanatorium admissions, 41.8 per cent were advised to have pneumothorax and it was actually performed on 230, or 26.5 per cent of admissions. Of 120 patients admitted during 1933 who were subjected to pneumothorax, 80, or 66.7 per cent, had pneumolysis performed. Speaking conservatively, it is indicated in over half of the cases of pneumothorax. Matson has estimated that 40 per cent of pneumothorax failures are due to adhesions interfering with satisfactory collapse and that intrapleural pneumolysis will convert 70 per cent of the unsatisfactory pneumothorax cases into satisfactory ones. Between October 31, 1932, and January 15, 1934, there were 103 thoracoscopies performed at Rutland State Sanatorium for the purpose of severing pleural adhesions, but in 3 cases this procedure was deemed unsafe or inadvisable, 2 later undergoing thoracoplasty with benefit. The ages of the patients ranged from 17 to 43, with only one over 40. Six cases were classified as stage 1, 50 as stage 2, and 44 as stage 3. Sputum prior to operation was bacilli-positive in 77, negative in 20, not stated in 3. Afterward it was positive in 22, negative in 77, not stated in 1. The sputum decreased in 64 cases, increased in 5, and was unchanged in 25, being unrecorded in 6. Scanty or absent sputum was present in 26 prior to operation and in 56 after operation. *Interval between beginning pneumothorax and pneumolysis:* This averaged slightly over six months, but the present average is below this, some of the earlier cases having waited a considerable time. The wisdom of long-continued efforts to stretch adhesions under positive pressures is doubted and the danger of producing bronchopleural fistula emphasized. On the other hand, the mere presence of adhesions is not an invariable indication for action and a sufficient period of observation should be allowed to note the results that may be accomplished without pneumolysis. In 47 cases all adhesions were severed, in 53 this was impractical or inadvisable. The principal reason was close adhesion between the two pleural layers in certain areas, while other reasons were vascularity or bleeding, poor visibility, fatigue of the patient and inadvisability of prolonging operation. An improved or even satisfactory collapse may result from partial severance. *Reactions and complications:* Immediate convalescence was uneventful in 28 cases. Elevation of temperature to 101°F. or more occurred in 12, mostly transitory. Dyspnoea was noted in 5, and pains in chest, shoulder, arms or back in 9. Nausea occurred in 8 cases, vomiting in 3, faintness and dizziness in 3. The most important untoward sequela is bleeding, which may come from severed vessels in the adhesion, usually the parietal segment, or from injury to intercostal vessels while introducing the trocar. No haemorrhage was encountered that could not be

controlled by the dull cautery or coagulation. However, any adhesion which appears to be vascular should either be coagulated first or avoided. In the presence of bleeding one must work rapidly and precisely before the visual field is obscured. Emphysema of tissues about the wound occurred in 42 cases, considerable in 11 of these. Several times escape of air from the chest threatened loss of collapse and this actually occurred in 4 instances and partly in 4 others. Early fluoroscopy and prompt or frequent refills after operation should help to avoid this. *Pleural exudates:* These occurred at some time after operation in 52 cases, in 3 cases being previously present. In a few cases the fluid was bloody and in 7 became purulent. This occurred most frequently in otherwise "bad" cases. Its end-results are not necessarily unfavorable, a negative sputum subsequently occurring in 5 cases. Three were treated with gomenolated oil (oleothorax) with benefit in two cases. In 2 cases external fistulas occurred. Altogether 3 of the 7 did badly and have a poor prognosis, 2 did well, and in 2 the outlook is doubtful. All showed tubercle bacilli in the pus on animal inoculation, 2 showed mixed pyogenic infection and one case a secondary contamination. *Bilateral cases:* Fourteen intrapleural pneumolyses were done upon 9 patients who had bilateral pneumothorax. In this group are included some desperate cases. Marked clinical improvement occurred in 4 following pneumolysis and some benefit in 4 others, with one fatality. One of these patients has since succeeded in joining the United States Marines, without medical sanction by the sanatorium. *Results and technique:* At present 85 per cent of the series are doing well, with marked improvement dating from the pneumolysis in 53. Seven patients were apparently made worse, and in 2 death occurred within two months. It is true that less striking improvement might have occurred in many without operation. The electrocautery is at present preferred, but not exclusively. Certain vascular adhesions are best coagulated before cutting, with high frequency electrodes. For most cases the Jacobacus-Unverricht instrument is preferred. With the Cutler-Davidson instrument one is confined to the high frequency current, it is of larger calibre and all procedures must be carried on through a single cannula. There are several efficient and reasonably priced outfits now on the market. In cutting with a high frequency current a sudden slip or movement is more injurious and it is believed that sloughing is more common. It has been demonstrated that a much more intense heat occurs between the electrodes than at the same distance with the cautery. Caulk concluded that cautery heat is less penetrating, occurring by conduction only. Some thoracic surgeons find an accessory illuminating device valuable, such as the McCarthy for-oblique telescope, which, however, cannot be used with a curved cannula.—*What We Have Learned from One Hundred Intrapleural Pneumolyses, F. H. Washburn, New England J. M., February 14, 1935, ccxii, 300.—(A. P.)*

Intrapleural Pneumonolysis.—During the last 20 years intrapleural pneumonolysis was performed on about 3,000 patients. With proper indications and perfect technique the method changed many unsatisfactory pneumothoraces into efficient pneumothoraces. Inefficient pneumothorax, due to adhesions, yielded only 9 per cent of satisfactory clinical results. Adhesions should not be severed unless pneumothorax has been maintained from 3 to 4 months, a sufficient time for stretching of adhesions. Only with definite and special indications, such as adhesions holding open a cavity from which haemorrhage occurs, should the operation be done at an earlier date. Ill effects are rare, provided the technique is good. A small exudate with slight febrile reaction occurs in many patients. Larger exudates were observed in 311 patients, but most of them resorbed spontaneously. The majority of these larger exudates were observed during the first 14 of the 20 years. The development of empyema occurred 31 times. This again was observed more frequently in the earlier part of the observation period. In 2,210 cases, in which all adhesions, interfering with collapse, were severed, 84.5 per cent obtained a fully effective pneumothorax. In 683 cases, in which only part of the adhesions could be severed, 32 per cent obtained a fully effective pneumothorax. The late results, that is, 2 years after the cessation of the pneumothorax treatment, 51 per cent of the patients were clinically cured and able to work, but this includes only those patients in whom complete collapse could be established through pneumonolysis.—*Die Thorakokaustik bei Lungentuberkulose, H. Unverricht, Münch. med. Wchnschr., March, 1935, lxxxii, 470.—(M. P.)*

Apical Thoracoplasty.—In a considerable percentage of patients treated with pneumothorax, apical adhesions prevent the collapse of cavities in the apical field. In some of these cases the maintenance of the incomplete pneumothorax is dangerous to the patient, because the cavity that is under

tension may perforate or enlarge, or produce bronchogenic spread. Various surgical methods can be employed to complete the collapse. Their choice depends on the proper evaluation of the mechanical conditions and on the correct localization of the cavities. On 39 patients, 43 operations were performed in an attempt to obtain complete collapse, which could not be secured by pneumothorax alone. The operations were as follows: 2 pneumonolyses, 17 phrenic interruptions, 8 apical thoracoplasties and 16 pneumonolyses plus apical thoracoplasties. Of the 43 cavities, 33 were collapsed following these procedures. The value of extrapleural pneumonolysis combined with an apical thoracoplasty is particularly emphasized.—*Die operative Engänzung des infolge Spitzenverwachsungen inkompletten Pneumothoraxes. Die mit partieller, extrapleuraler Pneumolyse kombinierte Spitzenplastik im Dienste des Pneumothoraxes, D. v. Szelöczey, Beitr. Klin. Tuberk., April, 1935, lxxxvi, 164.—(M. P.)*

Surgical Closure of Apical Cavities.—When cavities limited to the apex cannot be closed by therapeutic pneumothorax more radical measures are indicated. In certain cases the procedure of choice is interruption of the phrenic nerve either by crushing or exaeresis. This may be supplemented by a scalenectomy. In other cases extrapleural pneumolysis without rib removal is indicated and in still others the operation most suitable is a wide resection of the upper ribs.—*Surgical Closure of Tuberculous Apical Cavities, W. H. C. Romanis and T. H. Sellors, Lancet, April 6, 1935, ccxxviii, 802.—(B. T. McM.)*

Upper Thoracoplasty.—Partial upper thorocoplasties are useful procedures for the collapse of upper-lobe lesions. The various procedures that are recommended are as follows: apical thorocoplasty; anterior, anterior-superior and anterior-lateral thoracoplasty, and, posterior-superior thoracoplasty. Such selective thoracoplasties are less severe operations than complete thoracoplasties, and they do not interfere with the function of normal pulmonary tissue. Apical cavities which do not reach lower than the 2nd intercostal space present the indication for apical thoracoplasty. A modification, by the author, of Coffey's first rib resection is particularly recommended. In this operation, all the connective and muscular tissue which holds the pleural dome and which inserts on the first rib and along the vertebral column is separated. It is combined with a phrenicectomy, and with a total excision of the first 3 ribs. This is followed by a broad apicolysis down to the 4th rib. This produces a complete collapse of the apical portion of the lung. This procedure was used on 14 patients, 10 of whom showed a practical cure, and 3 improvements; one patient died a year following operation of some intestinal disease. Cavities in the anterior subclavicular region require the resection of the sternal segments of the 1st and 2nd ribs. Cavities in the lateral posterior apical region are collapsed by a posterior-superior thoracoplasty.—*Die selektive obere Thorakoplastik als eine Methode der Therapie der Lungentuberkulose, N. W. Antelawa, Beitr. Klin. Tuberk., April, 1935, lxxxvi, 200.—(M. P.)*

Venous Pressure after Thoracoplasty.—Unilateral elevation of the venous pressure after employment of collapse therapy for tuberculosis is an unfavorable sign. It is viewed by some as a signal of alarm which precedes intolerance to the collapse. Satisfactory venous pressure records before, during and after thoracoplasty in a total of 38 cases are reported. Three of these had preoperative elevated pressures which returned to normal after operation. Study of the remaining 35 shows that 11 had postoperative elevations, which returned to or approached normal after varying periods depending upon the accommodation made for the collapse. In general, the results show that first stages consisting of the removal of not more than 3 ribs are well-borne, while the removal of more is not. Performance of the second stage before the return to normal or within two weeks may prove dangerous. There is a relationship between postoperative unilateral elevation of venous pressure and the so called poor tolerance to collapse.—*Changes in Venous Pressure After Thoracoplasty. Its Significance in Relation to the Extent of Rib Removal, R. H. Overholt and L. S. Pilcher, J. Thorac. Surg., February, 1935, iv, 269.—(J. F. B.)*

Roentgenology and Thoracoplasty.—Since the density of the lung field following thoracoplasty approaches that of the abdomen, a technique similar to that used in kidney visualization is best employed. The density of the film should be slightly lighter than a film of the spine in the upper dorsal region. The optimal period for taking the roentgenogram following each stage of the operation is between 10 and 21 days, since this is before there is much rib regeneration and after the serum has absorbed. This collection of postoperative serum may completely obscure a patent cavity, push inward considerably the parietal pleura with the attached rib periosteum, or simulate the

margin of a completely collapsed lung. The roentgenologist's report on the localization of cavities and the amount of rib regeneration helps the surgeon plan the next stage of operation. Besides the stereoscopic, Potter-Bucky diaphragm roentgenograms, the usual routine type of exposure must not be neglected. Infiltrations in other parts of the lung, even though fibrotic, must be watched and any new spread of infection into good lung tissue detected.—*The Tuberculous Lung Following Thoracoplasty from the Roentgenographic Standpoint, W. R. Oechsli, Am. J. Roentgenol., February, 1935, xxxiii, 191.—(E. M. J.)*

Unsatisfactory Thoracoplasty Results.—Review in more or less detail of the unsatisfactory results in 8 cases of thoracoplasty brings out the following points: In cases of large single cavity the stages must not be far apart, nor should long posterior or anterior rib stumps be left. This is also true in cases of multilocular cavitation spread throughout the lung field. A third point is that too much must not be attempted at any one stage.—*A Critical Study of Some Unsatisfactory Results from Thoracoplasty Operations, W. A. Hudson, J. Thorac. Surg., February, 1935, iv, 281.—(J. F. B.)*

Pneumonocavernolysis.—The operation of exploration and palpation of the pulmonary lesion with direct compression by pleural lysis, followed by gauze packing, should not be considered as a satisfactory modification of thoracoplasty. Roentgenographic evidence of cavitation is considerably more accurate than palpation. Rib removal should be started with the transverse processes and not laterally and away from most cavities. Pleural lysis is rarely required. The results of the pack, long-continued suppuration, its painful removal and the persistence of air in the cavity for months are all objectionable. The pleura, thickened because of the pack, interferes with later results from thoracoplasty. End-results in 31 cases show a direct mortality of 10 per cent and closure of cavity in only 20 per cent.—*Experience with Pneumocavernolysis, B. P. Potter, J. Thorac. Surg., February, 1935, iv, 288.—(J. F. B.)*

Pneumonectomy and Lobectomy.—During the last 6 years rapid technical advances in surgical technique have greatly decreased the dangers incident to pneumonectomy and lobectomy. During the last 4 years at least 6 total pneumonectomies for bronchiectasis involving an entire lung, and at least 12 pneumonectomies for malignant disease have been successfully carried out. The present mortality rate is approximately 25 per cent. The fact that successful pneumonectomy has been demonstrated to be possible, has already stimulated interest in the early diagnosis of bronchial carcinoma, that is, in the operable stage, and it is therefore almost certain that a steadily increasing number of successful pneumonectomies will be reported. The surgical problems presented by carcinomatous and bronchiectatic patients are quite different. All the successful pneumonectomies for carcinoma have been one-stage operations. An anterior incision is preferable, because it gives direct access for the dissection of the pulmonary artery and veins in the anterior part of the hilum and because pleural adhesions are usually only few in number. A one-stage operation also favors dissection within the mediastinum and the healing of the sutured bronchial stump. It is feasible, because the absence of pronounced pulmonary suppuration reduces the danger of infection of the pleural cavity. The pleural cavity may be tightly closed without drainage, which permits the postoperative pleural exudate to obliterate the pleural cavity by organization and retraction. All the successful pneumonectomies for bronchiectasis have been two-stage operations, as a one-stage operation would be hazardous because infection would probably attack the pleura unprotected by the traumatic inflammatory wall that a preliminary stage produces. A posterior incision is best because extensive pleural adhesions are usually present. The published mortality rate for the newly developed lobectomy operations for unilateral bronchiectasis vary from 10 to 29 per cent. The death-rate of the two-stage operation is lower than that following the one-stage operation. Nevertheless, there is a difference of opinion as to which operation is better. The advantages of the one-stage operation are (1) it is more convenient for the patient and surgeon; (2) postoperative convalescence is relatively short; (3) the bronchopleural fistula that develops usually closes spontaneously. The chief disadvantages are (1) the relatively long operative time that is required increases the danger of shock and postoperative pneumonia; (2) the danger of haemorrhage is greater, and (3) severe infection of part or all of the pleural cavity sometimes occurs. The advantages of the two-stage lobectomy are (1) a traumatic inflammatory barrier against infection is set up; (2) the undiseased lobe is adherent at the time the second stage is performed, which guards against pendulum respiratory movements of the mediastinum and paradoxical movements of the homolateral lobe. The chief disadvantages of the

two-stage operation are (1) the patient must be operated on twice; (2) the empyema that follows is larger and takes longer to become closed for the reason that the adhesion of the remaining lobe to the thoracic wall prevents rapid expansion and filling of the empyema cavity; (3) approximately half of the patients require muscle graft operation to close the residual bronchial fistula. It is concluded, nevertheless, that the two-stage procedure seems, at the present time, to be the safer and the preferable operation.—*Pneumonectomy and Lobectomy, J. Alexander, S. G. O., June, 1935, lx, 1146.*—(*A. E. M.*)

Total Pulmonectomy with Recovery.—Total pulmonectomy, although occasionally attempted, was not successful until 1931, when Nissen, in Sauerbruch's clinic in Berlin, resected the entire left lung of a girl of 12, suffering from bronchiectasis secondary to traumatic rupture of the left main bronchus. In 1932 Haight, in Alexander's clinic in Michigan, removed the entire left lung of a girl of 13 with bronchiectasis, following delayed removal of an aspirated foreign body. In the last two years, Graham and Reinhoff in America have reported a few additional successful cases, mostly for growths. The present report deals with two cases of unilateral bronchiectasis, each recovering after removal of an entire lung, one right, the other left. Neither showed stenosis of the stem-bronchus. Mass ligatures were applied to the root to promote gangrene prior to ablation and this method appears to be the only one successfully used. Both were done at the Royal Victoria Infirmary at Newcastle upon-Tyne, England. The first patient, operated on early in May, 1934, was allowed to return home September 30, with two persistent small bronchial fistulae and otherwise good healing; the second patient, operated on October, 1934, was soon to be sent to a convalescent home (February, 1935).—*Pulmonectomy: a Preliminary Report on Two Cases in Which an Entire Lung Has Been Successfully Removed, G. A. Mason, British M. J., February 16, 1935, no. 3867, 299.*—(*A. P.*)

Dangers of Lobectomy.—Infection, acute cardiac and respiratory disturbances and accidents, constitute the three main groups of dangers in the performance of lobectomy. The cases of death under the heading of infection are empyema localized or total, septicaemia, chest-wall infection, contralateral pneumonitis and secondary haemorrhage from infected vessels. Some degree of empyema has been present in most of the present 13 cases, but was a factor in death in but two. Proper stump toilet and drainage are essential in the prevention of this possibly serious complication. Pneumonitis, usually in the contralateral lung, should be feared whenever sputum is profuse and more or less fluid. Closure of the main bronchus of the afflicted lung by an inflatable balloon seems efficient in preventing pneumonitis. Little more can be done to avoid secondary stump haemorrhage and cardiac thrombosis. More complete excision of infected tissue probably decreases the dangers of mediastinitis. Stabilization of the mediastinum must be accomplished before lobectomy to prevent such physiological disturbances as flapping mediastinum and paradoxical respiration. Pleural *poudrage* should be efficient for this. Tension pneumothorax due to leaking stumps can be overcome by sufficient drainage. Technical mistakes and accidents account for a few deaths. Consideration of various factors leads to the impression that Shenstone's one-stage operation is to be preferred although it remains to be said that the bad cases are still the dangerous ones.—*A Consideration of the Dangers of Lobectomy, E. Archibald, J. Thorac. Surg., April, 1935, iv, 335.*—(*J. F. B.*)

Pleural Poudrage.—In order to produce adhesions and anchor one lobe of the lung preliminary to removal of the other lobe, many methods have been employed. Some 20 are listed and their shortcomings are commented upon. The most successful has been that of dusting the pleural surface with 0.5 per cent iodized talc through a thoracoscopic cannula with a return air powder blower. Selective pleural adhesions without fluid formation can be produced at will.—*Pleural Poudrage, N. Bethune, J. Thorac. Surg., February, 1935, iv, 251.*—(*J. F. B.*)

Blood Changes during Treatment with Sanocrysin.—Following each injection of sanocrysin, the blood of 10 patients, 3 with pleuritis and 7 with polyarthritis, was studied for total red and white cells, differential count, content of haemoglobin and fibrinogen, coagulation and bleeding time, osmotic resistance of red cells, thrombocyte count, and the Rumpel-Leedes test for capillary reaction. A monocytosis and eosinophilia, with a thrombopoenia later, were observed. There was definite injury to the bone-marrow and to the capillaries, due partly to the heavy metal and partly to an unknown factor. The treatment should be blood transfusion and roentgen raying.—*Blutuntersuchungen während Sanocrysinbehandlung, G. Josephsen, Acta Tuberc. Scandinav., 1935, viii, fasc. 4, 271.*—(*F. B. S.*)

Fatal Asthma.—The authors present a case-report of progressive and fatal asthma in a female aged 69. The autopsy revealed the majority of the bronchi filled with a glistening, hyalinized exudate, with a purulent exudate in some of the small bronchioles. The mucous exudate in the larger bronchi appeared in whorls and laminae, richly infiltrated with eosinophilic cells. In order to substantiate the theory of hypertrophy of bronchial musculature in asthmatics, careful measurements were made according to the method of Huber and Koessler. These measurements showed a very definite increase in the thickness of the muscle-layer as compared to the thickness of the muscle-layers in bronchi of similar size obtained from non-asthmatic patients. This hypertrophy was most apparent in the bronchi from 3 mm. to 7 mm. in diameter. In the authors' opinion, whorling and inspissation of mucus, together with the heavy eosinophilic infiltration, are characteristic of bronchial asthma. These mucous casts of the small bronchi represent embryonic Curschmann's spirals, which are later coughed up, after the relaxation of the muscle spasm. They should be present *in situ* in those cases in which death comes during an asthmatic paroxysm. The degeneration of the mucous glands found is probably the result of prolonged overactivity. This case offers further confirmation of Huber and Koessler's assertion that the musculature of the bronchi is thickened in asthmatic patients when compared with normal controls.—*Fatal Asthma: Report of Case with Bronchial Measurements, H. M. Bubert and C. G. Warner, J. Am. M. Ass., April 27, 1935, civ, 1469.*—(*G. L. L.*)

Vascular Changes in Atelectasis.—Atelectasis was produced in 7 dogs. Microscopical and gross changes in the lungs were studied at varying intervals, and the oxygen and carbon-dioxide content of blood from several sources were determined. The collapsed lungs were then reinflated as much as possible by a pressure of 35 mm. Hg and the above studies repeated. The results obtained indicate that in massive atelectasis there is an apparent increase in the vascularity which is congestive in nature and a decreased volume flow of blood in atelectatic tissue. In long-continued atelectasis there is some disintegration of the alveolar walls and production of a moderate amount of fibrosis. Marked fibrosis was shown in infected atelectatic tissue. Decreased volume flow was shown by oxygen determinations, injections of the pulmonary arterial systems, and by bleeding of atelectatic lobes. The oxygen saturation of mixed arterial blood was affected little by production of left atelectasis.—*Vascular Changes in Experimental Atelectasis: Morphological, Physiological and Biochemical, W. E. Adams, L. Hrdina and L. E. Dostal, J. Thorac. Surg., April, 1935, iv, 377.*—(*J. F. B.*)

Atelectasis Due to Perforation of Bronchial Nodes.—Several cases are reported, with emphasis on roentgenological findings, in which a tuberculous lymph node broke into the bronchus and caused atelectasis or atelectatic pneumonia. The rupture is accompanied by cough, and, at times, by haemorrhagic sputum. A bronchial stenosis is produced which caused an atelectasis of the lobe whose bronchus is stenosed. A simple atelectasis does not cause any constitutional symptoms, but, if pneumonia develops in the atelectatic portion, general symptoms occur. Roentgenologically, atelectasis, atelectatic pneumonia and bronchial stenosis are demonstrable. This permits the differential diagnosis from other stenosing processes, such as bronchial carcinoma. As soon as the caseous or calcified material is expectorated, atelectasis disappears.—*Atelektase und atelektatische Pneumonie bei Ausstossung oder Durchbruch eines tuberkulösen Drüsenherdes in den Bronchus, F. Fleischner, Beitr. Klin. Tuberk., February, 1935, lxxxvi, 72.*—(*M. P.*)

Atelectatic Bronchiectasis.—It is well known that bronchiectasis, either congenital or acquired, may occur as a consequence of atelectasis. The bronchial dilatation should be considered as a compensatory effort to fill up space left free by collapsed lung tissue (as explained by Hasse in 1846) rather than secondary to fibrosis of peribronchial pulmonary tissue with consequent traction on the bronchi or to increased intrabronchial pressure. Within recent years the presence in the roentgenogram of a so-called triangular shadow in one or the other diaphragmatico-vertebral angles has been stressed, as indicating the presence of atelectasis which may lead to bronchiectasis. Similar shadows may occur, however, in pneumonia, mediastinal pleurisy, and pulmonary fibrosis. The only definite proof of atelectasis is disappearance of the shadow following inflation of the collapsed lung by deep breathing (CO_2 and O_2). The author reports 3 examples of bronchiectasis with an accompanying triangular shadow. In all the bronchiectatic lesion was situated at the right base, was of mild degree, and was completely recovered from. In one, the shadow was certainly due to collapse, as indicated by inflatability. In the other, collapse was the probable cause, and in the third case,

pneumonic consolidation seemed to be the most likely aetiological factor.—*Atelectatic or Compensatory Bronchiectasis, L. Findlay, Arch. Dis. Child., April, 1935, lvi, 61.—(M. D.)*

Artificial Pneumothorax in Lobar Pneumonia.—Forty patients with lobar pneumonia were treated by artificial pneumothorax, while 100 other unselected cases were used as controls. All the cases treated with pneumothorax had a unilateral lobar pneumonia confirmed by physical signs or roentgenography. Air was introduced on admission regardless of the day of the disease. The amount given was usually between 400 and 600 cc., repeated, in most cases, in 24 hours. At no time was a positive intrapleural pressure produced. The mortality in the control group was 51 per cent, and in the pneumothorax treated group 35 per cent. The most spectacular immediate result was the relief of pain. Cyanosis, when present, was usually relieved. When pain was relieved by the introduction of air, dyspnoea usually disappeared. There was probably a beneficial effect on symptoms of toxaemia, except in the presence of a severe toxic psychosis. The average duration of fever after the first pneumothorax was 3.5 days, while in the control group the average was 7 days. In 18 of the 40 patients treated by pneumothorax the temperature fell by crisis within 24 hours after the injection of air. In 16 cases lysis occurred, and in 6 cases pneumothorax produced no temperature change. Spontaneous crisis occurred only 7 times among the cases treated by methods other than pneumothorax. Complications occurred in equal frequency in both groups, except that bacteraemia occurred in the cases treated by artificial pneumothorax in only 12 per cent, whereas it occurred in 27 per cent of the control group. Artificial pneumothorax therefore offers greater hope for recovery, greater comfort during illness, and a shorter period of convalescence than the other non-specific measures used in the treatment of pneumonia.—*Artificial Pneumothorax in the Treatment of Lobar Pneumonia, A. Behrend, F. L. Tuck and W. E. Robertson, J. Lab. & Clin. Med., June, 1935, xx, 914.—(A. E. M.)*

Artificial Pneumothorax in Lobar Pneumonia.—Twelve selected patients with acute unilateral lobar pneumonia were treated by artificial pneumothorax. Preliminary roentgen films were made in each instance, to exclude bilateral pulmonary involvement and to confirm the diagnosis. In most of the patients of this series a pneumothorax was administered on the fifth day of the disease or later. Four patients obtained immediate symptomatic relief that was quickly followed by a lowering of the fever and of the pulse-rate. Four patients obtained symptomatic relief but there was no lowering of the fever or pulse-rate. Four patients died. Analysis of the fatal cases revealed no proof that pneumothorax aggravated the disease or contributed to the fatal outcome. The postmortem observation in one case, however, suggested that marked fibrinous pleuritis and pyopneumothorax may be stimulated by the procedure. Although it is difficult to evaluate a crisis-inducing therapeutic measure in pneumonia, it did appear that the procedure brought on an artificial crisis in 4 patients. The striking effect was the immediate relief from pain and dyspnoea and in one instance from hiccoughs. This is undoubtedly due to the separation of the two inflamed pleural surfaces.—*Artificial Pneumothorax in the Treatment of Acute Lobar Pneumonia, L. E. Hines and D. Bennett, Arch. Int. Med., January, 1935, lv, 100.—(A. E. M.)*

Treatment of Acute Pneumothorax.—This condition may be due to injury, abscess, neoplasm or other causes. The most common causes, however, with which this paper particularly deals, are tuberculosis or rupture of an emphysematous bleb. The initial treatment will be the same, whatever the aetiology. It depends primarily on the symptoms presented, which may vary from none at all to severe pain and extreme dyspnoea. In the milder cases, if the patient is kept in bed, reëxpansion occurs in a few days. Getting up and about will delay reëxpansion and increase the likelihood of complications, such as exudate and persistent fistula. If the tear in the visceral pleura is valvular, more and more air will be aspirated and give rise to increasing dyspnoea; hence nursing or hospital care during the first twenty-four hours should be insisted on. If pain or dyspnoea are marked, morphine, gr. $\frac{1}{4}$, should be given at once, and a large needle (either an aspirating needle or a Saugman pneumothorax needle) inserted into the pleural cavity, preferably through the 5th interspace in the midaxillary line, and left as long as air can be heard whistling out. Preliminary local anaesthesia is used if possible. If air continues to enter, the needle should be left in the pleural cavity, being strapped to the chest-wall and connected with a rubber tube, the lower end of which is in a water receptacle on the floor, thus making a water-valve to prevent entrance of air through the tube. The urgent symptoms

having been relieved, the patient should be left comfortably propped up in bed with pillows, subsequent treatment depending on developments. Even when the symptoms abate without complications the patient should be kept in bed until the lung has reëxpanded and then given a brief holiday before returning to work. If the lung re-expands rapidly without formation of an exudate, the aetiological factor is most likely a ruptured bleb, especially in young men, which may recur, but is not due to tuberculosis. When the lung fails to reëxpand despite a bed-rest, it is usually wise to remove from 500 to 700 cc. of air with a pneumothorax apparatus, without lowering the intrapleural pressure below −15 cm. of water; if further reduced, faintness or collapse may supervene. The procedure may have to be repeated two or three times. Clear sterile exudates are usually tuberculous, and are treated like ordinary tuberculous serous pleurisy. If rapid healing does not occur and more air appears to enter, examination of the chest with the thoracoscope is indicated and, if necessary, cauterization of adhesions holding open a tear. Exudates which become purulent are more grave. Aspiration followed by lavage with a 1–4,000 solution of methylene blue is advised. With a patent tear the sputum will be colored blue and in such cases no irritant, such as Dakin's solution, should be introduced. Large perforations give rise to amphoric or metallic breath-sounds, with the well-known bell phenomenon. In the case of purulent exudates without patent perforation, aspiration of the pus and replacement by air as in the case of ordinary exudates, is the best procedure. If, after an interval, there is no reëxpansion, pleural lavage with Dakin's solution may be carried out, the patient lying on the healthy side. For this, the needle is connected with a 50-cc. syringe by means of a three-way stopcock. As this process proceeds, a Saugman needle, connected with a pneumothorax apparatus, is inserted higher up in the axilla and manometric oscillations watched for. Sufficient air should be introduced to keep a slightly negative pressure, as described. Both needles are then removed. If the pus persistently reforms and there is no evidence of reëxpansion, a gelatinothorax may be induced, using a 2 per cent solution of gelatin in physiological saline solution, adding acriflavine before using, in a proportion of 1–2500. The same three-way stopcock method is used, but less of the solution is introduced than for an ordinary irrigation. If reactions occur, do not repeat; otherwise, aspirate completely after three days and introduce air as previously described, followed by 200 to 300 cc. of gelatin-acriflavine. If this is not effective, thoracoplasty is indicated. A patent visceral pleura is a bad omen, but the gelatin-acriflavine treatment may be tried, also endeavoring to build up the patient. The pleural cavity must be kept as clean as possible and tube-bottle drainage may be carried out. If the perforation heals, the pneumothorax cavity will require obliteration either by reëxpansion of the lung or by thoracoplasty.—*Acute Pneumothorax, L. S. T. Burrell, Brit. M. J., January 12, 1935, no. 3862, 67.*—(*A. P.*)

Persistent Infected Pneumothorax.—The dangers and possible complications of only aspiration treatment of empyema are shown in the detailed discussion of a single case. This 5-year-old boy, after an acute empyema, developed a massive pneumothorax and several bronchopleural fistulae, and was extremely ill, probably because of the inadequacy of the drainage of the empyema by aspiration. Cure was accomplished only after the removal of portions of two ribs and the intervening tissues, release of the adherent lung, and packing of the widely explored excavation. Permanent phrenic-nerve paralysis was added when the lung began to expand.—*Persistent Infected Pneumothorax, A. S. W. Touroff, Am. J. Surg., January, 1935, xxvii, 57.*—(*J. F. B.*)

Simultaneous Bilateral Pneumothorax.—Among all the complications of bilateral artificial pneumothorax, perforation of the lung is the one that has had the greatest influence in restricting the use of this procedure. It is in most instances a dramatic accident, bringing about death from asphyxia. In cases treated with artificial pneumothorax, in which the contralateral lung becomes affected with the disease, aurotherapy is the main recourse against the extension of the tuberculous process. Aurotherapy should always be tried before attempting bilateral pneumothorax. Cases of bilateral ulcerative lesions surrounded by healthy parenchyma should be preferred for bilateral artificial pneumothorax, because the danger of spontaneous perforations is less in these cases. As a last resort, bilateral artificial pneumothorax may be tried in diffuse, nodular or pneumonic lesions, provided that at least half of the pulmonary parenchyma remains healthy. Definite contraindications to simultaneous bilateral artificial pneumothorax are any extensive diffuse bilateralization, especially the nodular type; any grave extrapulmonary complication, and, above all, an imperfect pneumothorax of the side where the lesion first started. Cachexia and cardiopathies are

also contraindications.—*Sobre neumotórax bilateral simultaneo, J. I. Baldó, Rev. Policlin., Caracas, June, 1934, iv, 1054.—(J. R. P.)*

Pneumothorax and Cardiac Output.—The authors have made a study of determinations of cardiac output on 6 patients with unilateral pneumothorax. Three were cases of tuberculosis and were followed before and during pneumothorax treatment; one with healing lung abscess was studied during partial pneumothorax and again after re-expansion of the lung; two cases of spontaneous pneumothorax were studied during various stages of collapse. All cases were afebrile. The method of study employed the Fick-principle, arterial blood being drawn for arterial CO_2, and oxygenated venous CO_2 also being obtained by another method. In two cases of artificial pneumothorax the cardiac output was definitely diminished when unilateral pneumothorax was established. In the third case there was some reduction of output, but not beyond the error of the method employed. The values for the cardiac output of each case, in litres per minute per square meter of body surface, were also plotted against the degree of collapse of the lung. In one case of artificial pneumothorax, and in the two cases of spontaneous pneumothorax with positive intrapleural pressures, no consistent relation between the cardiac output and the amount of pulmonary collapse was demonstrated.—*Cardiac Output in Relation to Unilateral Pneumothorax in Man, A. Cournand, N. A. Bryan and D. W. Richards, Jr., J. Cl. Inv., March, 1935, xiv, 181.—(G. L. L.)*

Spontaneous Pneumothorax and Acute Pulmonary Diseases—The aetiology of spontaneous pneumothorax is not of uniform pathogenesis. After reviewing the literature and observing one case, the aetiological rôle of pulmonary tuberculosis in spontaneous pneumothorax seems not to be established. The old suggestion of Laennec according to which pulmonary emphysema causes spontaneous pneumothorax is revived. Chiefly responsible is localized emphysema adjacent to inflammatory pulmonary foci with oedema of the alveolar walls and desquamation of the epithelium, such as occurs in cases of pneumonia and bronchopneumonia in childhood and adult life. Besides vicarious emphysema and bronchopulmonary inflammation, an important aetiological rôle is played by the increased intraalveolar pressure due to the impaired pleural function, shown autoptically as oedema and increased friability. The verification of this theory by autopsy is hardly obtainable, since spontaneous pneumothorax has usually a good prognosis.—*Le pneumothorax spontané au cours des pneumopathies aigues de l'adulte, J. Minet and E. Houcke, Arch. Méd-Chir. de l'App. Resp., 1935, ix, 488.—(F. G. K.)*

Treatment of Empyema.—The treatment of empyema is a problem in bacteriology and physics. In the presence of thin exudate, movable mediastinum or free lung, the chest-wall must be kept intact. Needle aspiration or catheter drainage may be satisfactory but neither may be adequate. They should not be employed too long. Rib resection and open drainage are reserved for those cases in which an open pneumothorax will have no effect upon the contralateral lung. It is the most efficient of all methods. Drainage should be made at the lowest portion of the pleural space. Lung reëxpansion is a gradual process. After open drainage two factors must be considered, the contractile force of pleural adhesions and the stretching effects of forced inspiration. The former is almost invariably the main factor. In the closed thorax the maintenance of a negative intrapleural pressure assures expansion of the lung and adhesions maintain it. Irrigations may be necessary to eliminate thick exudate. Dakin's solution is the best irrigant. Closed drainage, with irrigations if necessary, will bring most empyemata to complete healing earlier than open drainage, but it is not applicable to all cases. The physics of maintenance of negative pressures by suction and the surgical technique of its application are discussed.—*Observations in the Treatment of Empyema with Special Reference to Drainage and Expansion of the Lung, O. H. Wangensteen, J. Thorac. Surg., April, 1935, iv, 399.—(J. F. B.)*

Chronic Thoracic Empyema Treated with Maggots.—A 60-year-old male with a right basal bronchiectasis was readmitted to the Royal Victoria Hospital because of the recurrence of a right-sided empyema, which had been successfully drained two years previously by simple rib-resection. Five hundred cubic centimetres of grayish-green thick pus was aspirated in which were found, by smear and culture, streptococci, but no spirochaetes or tubercle bacilli. A partial Schede operation was performed, with resection of 5 inches each of the 8th and 9th ribs from their angle forward and excision of very thick fibrotic calcified costal pleura. A 500-cc. empyema pocket was revealed that ran up underneath the 7th rib to the anterior axillary line. This pocket was

washed with saline solution, a test-tube full of maggots was put into the wound, the edges were bound with adhesive, and a screen put over the top. An electric light was suspended near the cage to drive the maggots into the depths of the wound. This procedure was repeated when the first batch of maggots died. Within one month the empyema pocket became filled with a clean pink healthy granulation tissue, and the discharge became negligible. The case was followed for two and one-half years with no recurrence of the empyema. This is believed to be the first case reported in the literature of the use of maggots in chronic recurrent empyema.—*A Case of Chronic Thoracic Empyema Treated with Maggots, N. Bethune, Canad. M. A. J., March, 1935, xxxii, 301.*—(*A. E. M.*)

Empyema Complicating Neoplasm.—The presence of pus in the chest of an elderly patient not traceable to a recent pneumonia should lead one to suspect intrapulmonary neoplasm. Two cases of empyema thoracis are reported in which the primary cause was bronchial carcinoma.—*Empyema Complicating New Growth of the Lung, E. T. Baker-Bates and G. R. Ellis, Lancet, March 23, 1935, ccxxviii, 76.*—(*B. T. McM.*)

Combined Mediastinal and Apical Empyema.—A case of double pneumococcal empyema, right subapical and mediastinal, is reported, with serial anteroposterior roentgenograms. The authors found little mention of such a condition, confined to one side, in the literature. The patient, a man of 45, was admitted with a right lobar pneumonia, following which he developed indications of two separate pleural collections of pus, the subapical one being explored and drained posteriorly and showing pneumococci. The mediastinal collection was not disturbed surgically. One or both apparently ruptured into the bronchi about a week after his operation and thereafter improvement was continuous, with almost complete disappearance of both by the twenty-eighth day.—*Mediastinal and Apical Empyema, S. J. Hartfall and L. N. Pyrah, Brit. M. J., December 8, 1934, no. 3857, 1039.*—(*A. P.*)

Pulmonary Suppuration.—Controlled experiments were outlined to study, among other things the organisms responsible for pulmonary abscesses, the pathogenesis of pulmonary suppuration and the dependence of the prognosis upon the organisms present. In 7 dogs cotton plugs impregnated with infectious material were implanted in the secondary and tertiary bronchi. In 9 others the resistance of certain areas was lowered by previous sterile emboli. No pulmonary abscess developed. In 40 dogs the infectious material was introduced in emboli, 19 with segments of veins and 21 with blood-clots. Over 92 per cent of these animals showed lung abscesses. Duration of the abscesses was from 4 to 150 days. In those with portions of vein introduced only 10 per cent had fatal empyemata in contrast to 33 per cent in the blood-clot-embolus group. Fatal haemorrhage occurred in 5 and 19 per cent in these respective groups. The dilatation of the bronchial artery in the presence of an infected embolus accounted for the difference in the course of the lesions in these groups. A series of experiments was then made which clearly showed the increase in virulence of the organisms by passage through a series of abscesses. Elaborate aerobic and anaerobic cultures were made on special media of the various organisms as a preliminary study in the determination of possible proteolytic action on tissue *in vitro* of various combinations of these organisms. It is concluded that, experimentally, lungs are resistant to bronchogenic inoculation but are susceptible to the formation of abscesses from septic emboli. A combination of modes of infection must be present in some cases.—*Experimental Studies on Pulmonary Suppuration, J. J. Longacre and L. G. Herrmann, Archiv. Surg., March, 1935, xxx, 476.*—(*J. F. B.*)

Lung Abscess.—The defense mechanism of normal and abnormal lung tissue against abscess-formation is one of considerable complexity. The earliest stage in the localizing mechanism is the adherence of bacteria to the wall of the alveolar septum or their engulfment by macrophages or leucocytes. The primary essential conflict is between bacteria and the pulmonary phagocytes. These experiments constitute a study of the effects of localized immunity on the course and development of experimental pulmonary abscesses. Vaccines of *Staphylococcus aureus* and of *Bacillus coli* were prepared. Specific intratracheal immunization was obtained in 33 dogs, nonspecific in 4, and specific subcutaneous in 5, while 33 were used as controls. Emboli infected with homologous bacteria were introduced into the jugular veins of 14 specifically immunized dogs and 14 controls. Ten days later in all the controls there were abscesses of varying size, ragged, frequent distal infarction and no macroscopic or microscopic evidence of healing. In the immune dogs only 4 showed abscesses and in these there was evidence of limitation of

the infection and of healing. Similar procedures were applied to a group of generally immunized dogs. The evidence of protection or limitation and healing of the abscesses was not so sharply defined as in the locally immunized group. The reactions of the nonspecific locally immunized dogs were found to resemble those of the normal control group. Although natural conditions are not obtained in these experiments and contact of the infecting agents with pulmonary tissue was delayed by 24 hours' growth in the emboli the contrast between the immunized and nonimmunized groups was sharp and distinct. Local immunization was more effective than general. Nonspecific immunity was not as effective as specific immunity.—*Effects of Local Immunization on the Development of Experimental Abscesses of the Lung, W. M. Tuttle and P. R. Cannon, Arch. Surg., February, 1935, xxx, 243.*—(*J. F. B.*)

Experimental Thoracogenic Scoliosis.—Supplementing an earlier clinical report on 638 patients, these animal experiments give added information regarding the factors in the production of scoliosis. The spines of both man and animals bend after an imbalance has been produced either within the thorax or in the chest-wall. Gross muscle imbalance provoked extensive curvature although animals seem to be more able to compensate for this and even to straighten the spine, probably because of the difference in weight distribution and posture. The curvatures produced by muscle or rib imbalance are rotary scoliosis as well as lateral. Pleural scars produce curvatures in animals as well as in man in the same manner.—*Experimental Thoracogenic Scoliosis, J. D. Bisgard, J. Thorac. Surg., April, 1935, iv, 435.*—(*J. F. B.*)

Acute Cor Pulmonale.—The authors present case histories of 9 patients with the acute cor pulmonale secondary to pulmonary embolism. The symptoms and signs of extensive pulmonary embolism are variable, but predominating at first are those of shock, namely, collapse, pallor, sweating, apprehension, and a fall in blood-pressure, to be followed by reaction to the infarction itself, namely, fever and elevation of the pulse and respiratory rates. If the shock from extensive pulmonary embolism is not too great, there may be found signs indicative of the secondary effect of the pulmonary embolism on the heart itself: that is, the acute cor pulmonale (dilatation of the right chambers) attended by pulmonary artery dilatation. Cyanosis and engorgement of the neck veins were common manifestations at some time during the attack. Pleural friction rubs were heard frequently. Electrocardiograms taken soon after the occurrence of the pulmonary embolism showed similar changes in five of the patients, and in two others taken some time after the attack they had some of the characteristics, although less definite. The significant changes are the presence of a Q-wave and late inversion of the T-wave in lead 3, the rather low origin of the T-wave with a gradual staircase ascent of the ST-interval in lead 2, a prominent S-wave and a slightly low origin of the T-wave in lead 1, and an upright T-wave (with inverted P- and QRS-waves) in lead 4. In none of the cases was left-axis deviation present at the time of the acute episode, whereas the tracings of 2 patients showed definite right-axis deviation. Follow-up studies indicate that the electrocardiographic changes are temporary and may disappear within forty-eight hours after the attack of pulmonary embolism.—*Acute Cor Pulmonale Resulting from Pulmonary Embolism; Its Clinical Recognition, S. McGinn and P. D. White, J. Am. M. Ass., April 27, 1935, civ, 1473.*—(*G. L. L.*)

Pulmonary Asbestosis.—Thirty-eight cases of pulmonary asbestosis were studied with special reference to asbestos bodies, clumps of asbestos bodies, elastic fibres, and tubercle bacilli in the sputum. Twenty-one of the cases were males and 17 females. In 7 cases there was inadequate information. Eleven cases died and in the 10 examined postmortem asbestosis was found. Of the 20 cases living, 2 are acutely ill with pulmonary tuberculosis, 2 are doubtfully tuberculous, 9 are apparently uncomplicated cases of severe and progressive pulmonary asbestosis, 3 have evidence of mild asbestosis, and 3 are in excellent health. The age of entering the asbestos factory ranges from 13 to 39 years; average, 21 years. The duration of exposure ranged from 1 to 50 years; average, 15 years. The average duration for the 8 cases having associated tuberculosis was 9.2 years, as compared to 16 years in the nontuberculous group. Asbestos bodies were present in all but one case, and with two exceptions they were demonstrated at every examination. In one of these cases only a solitary body could be demonstrated at the end of 10 years' exposure. The presence of the bodies is indicative merely of exposure to asbestos dust; the type of body is of considerably greater significance than the number. The large size indicates a long interval since the onset of exposure, while old "weathered" bodies on repeated examinations strongly suggest a definite pathological process. This is probably a constant process but may be

accelerated by the occurrence of caseous or suppurative changes. Clumps of asbestos bodies are definite evidence of lung disintegration, but the converse is not necessarily true, and in either case their presence is virtually diagnostic of an underlying asbestosis. Clumps were found in 10 cases of this series. Five of these also had tuberculosis; three of these have died and two are now critically ill. Of the remaining 5 cases, two have died; one of cerebral softening, acute bronchitis and broncho-pneumonia, and the other of bronchitis and cardiac failure. Both had underlying asbestosis. The remaining three have progressive pulmonary asbestosis, fully confirmed by clinical and radiological examination. However, among the rest of the 38 cases there are many who have definite disintegration of the lung. Elastic fibres are probably indicative of rapid lung destruction; they may be present in the sputum in pure asbestosis (both with or without clumps) or in asbestosis with associated tuberculosis. Elastic fibres were found in 3 of the 6 cases of this series in which the special examination was made; in one there was no evidence of tuberculosis, and only one body was found at the end of 10 years of exposure. In the second case there was a rapidly progressive form of uncomplicated pulmonary asbestosis, and in the third case there was an associated destructive tuberculous process. Each sputum specimen was searched for tubercle bacilli, and in the series an incidence of 21 per cent of associated tuberculosis was found. —*A Study of the Sputum in Pulmonary Asbestosis, R. C. Page, Am. J. M. Sc., January, 1935, clxxxix, 44.*—(*E. M. J.*)

Intrathoracic Tumors.—Progress in the surgery of intrathoracic tumors is made slowly because of technical difficulty in their removal and because of the difficulty in early diagnosis. Emphasis upon the early symptomatology and the signs present in two fatal cases is made since progress in early diagnosis must be made. In the first case, one of malignant pleural neoplasm, the symptoms in their order of appearance and importance were pain, dyspnoea, cyanosis and cough. Roentgenograms were of more aid than was physical diagnosis. At operation this tumor was so widespread and so friable that complete removal could not be accomplished. The second case, one of spindle-cell sarcoma, also died postoperatively directly from emphysema and pneumothorax. The first symptom was hoarseness, which may have been due to laryngitis. But weakness, anaemia, dyspnoea and cough followed. There again study of the symptoms and physical examination failed to make the diagnosis until correlated with roentgenograms supplemented by bronchoscopy and pneumothorax. In the technical discussion it is shown that lungs should not be overexpanded postoperatively and that closed drainage should be employed whenever there has been injury to the lung parenchyma.—*Intrathoracic Tumors, C. Eggers, Am. J. Surg., January, 1935, xxvii, 52.*—(*J. F. B.*)

Bronchogenic Carcinoma.—Marked differences in the morphology and malignancy of bronchogenic carcinomata exist, depending upon the site of origin. Most, if not all, primary pulmonary carcinomata arise from bronchial epithelium. The lining of the major bronchi is of 3 types of cells, namely, ciliated, goblet and undifferentiated cells. The indifferent cells probably differentiate into both goblet and ciliated cells. The mucous glands of the bronchi apparently have their origins in the bronchial epithelium. A separate classification of mucous-gland cancer is unnecessary. All primary cancers of the lung may be considered as bronchogenic in origin, since all the epithelial elements of the lung arise from the same primitive epithelium. More clinical help can be obtained, however, from a statement of the point of origin of a tumor than from a description of the cell morphology. Both gross and microscopical changes secondary to carcinoma are most varied. Metastasis may be early or late. The tumors of peripherial origin usually metastasize early and widely. This seems to parallel a group of experiments in which it was shown that particulate matter from the periphery of the lung was carried to the regional lymph nodes more rapidly than that from the wall of a major bronchus. The sites of metastasis are most varied. In this series the liver was involved in 43.3 per cent of cases, the adrenal in 33.3 per cent, the brain in 23.3, kidney 26.6, lung 23.8, pancreas 13.3, and the spleen in 10 per cent. The diagnosis of cancer is made by microscopical examination of tumor cells. Although biopsy is not an innocuous procedure, an expert bronchoscopist can secure most valuable and vital information. The prognosis in this disease varies considerably. From the 60 cases studied, a cytological classification was made, and it was found that patients with tumors made up of well-differentiated cells lived for an average of 22.6 months. The group with tumors with less differentiated cells lived 16 months, and those with tumor cells resembling those of the basal epithelial layers lived only 12.8 months. When studied with the point of origin in mind, it was found that patients with tumors arising in the

primary bronchi lived nearly four times as long as those with tumors arising in the periphery. And those whose tumors could be seen with a bronchoscope lived on an average of 33.9 months, while those whose tumors could not be seen lived but 13.7 months. It is felt that primary cancers of the lung should all be considered as bronchogenic in origin, since the origin of the various types of cells is one common cell, the basal layer of the bronchial epithelium. Consideration of the position of the tumor is of great prognostic value. Although treatment is not discussed at length the most optimistic results have been obtained from surgical removal of the affected lobes and the proper lymphatics.—*Bronchogenic Carcinoma: a Classification in Relation to Treatment and Prognosis, W. M. Tuttle and N. A. Womack, J. Thorac. Surg., December, 1934, iv, 125.*—(*J. F. B.*)

Bronchial Carcinoma.—Since the value and importance of bronchoscopy and bronchoscopic biopsy has been emphasized by so many, the interest of this presentation is a consideration of the changes in bronchial carcinoma as seen through the bronchoscope. A colored plate of bronchoscopic views of several types of tumor is included. The interest of prognosis and treatment is centered upon variations in gross and microscopical morphology, which might coincide with some constant feature of the disease. A rational analysis of the histological and embryological features of this group of tumors seems to point toward their origin from a common cell, a postembryonic undifferentiated cell. There are, however, two main classes of bronchogenic neoplasms, the adenocarcinoma and the squamous-cell carcinoma. Two subdivisions have been made of these. The first is a tumor made up of undifferentiated cells, polymorphous, rather mature in type, occurring often in solid masses, with homogeneous cytoplasm and large nuclei and varying mitotic figures. Probably this is a type of adenocarcinoma. The second subgroup is made up of combined adenocarcinoma and squamous-cell carcinoma. This whole group constitutes about 70 per cent of all bronchial carcinomata. The remaining 30 per cent are of tumors made up of undifferentiated cells. These may be subdivided into two groups, the medullary and the basal-cell carcinoma. However, variations in cell structure in different parts of the tumors are so great that it is not practical to consider these subdivisions except as showing varying degrees of anaplasia. In the whole group studied there was little difference in prognosis in the several types of tumors. Complicated classifications do not help in prognosis nor treatment. Grading of tumors must be done with caution but this does not decrease the value of biopsy. Brief summaries of 32 cases with descriptions of the bronchoscopic findings, several drawings and photomicrographs are included.—*Bronchial Carcinoma, C. L. Jackson and F. W. Konzelmann, J. Thorac. Surg., December, 1934, iv, 165.*—(*J. F. B.*)

Diagnosis of Bronchial Carcinoma.—In a series of 18 patients with bronchial carcinoma, 16 of which were necropsied, the following symptoms and signs were present: Chronic pneumonia (with abscess-formation, or gangrene, or simple indurative changes) in all; haemoptysis, usually recurrent, in 15; stenotic breathing in 6; haemorrhagic pleuritis in 6; involvement of the superior vena cava (obstruction or invasion) in 8. It is emphasized, in particular, that the presence of a chronic pneumonia necessitates careful examination for malignancy.—*Zur Diagnostik des Bronchuscarcinomas, A. Kenner, Beitr. Klin. Tuberk., March, 1935, lxxxvi, 9.*—(*M. P.*)

Cancer and Tuberculosis of Lung.—On the basis of reports in the literature and careful autoptic findings in 4 cases, it is concluded that there is no definite antagonism between tuberculosis and carcinoma and that tuberculosis does not prepare the soil for carcinoma any more than other pathological processes. It is not justified to consider tuberculosis as a praecancerous disease, although it may prepare the ground for neoplastic processes, just like any other pathological change which is accompanied by regenerative processes.—*Die Vergesellschaftung von Lungentuberkulose mit Lungencarcinom, W. Brokschmidt, Beitr. Klin. Tuberk., February, 1935, lxxxvi, 49.*—(*M. P.*)

Hodgkin's Disease.—Pathological conditions in lymph nodes may be divided into two groups: those which are secondary to disease elsewhere in the body and those in which lymphoid tissue is the structure primarily involved. In the second group occurs Hodgkin's disease and its diagnosis is not always easy. Histologically, the only special feature of Hodgkin's disease is the Hodgkin cell. This cell has been previously designated as the "Dorothy Reed" or "Paltauf-Sternberg" cell. It has a much more variable appearance than is generally recognized, and is better designated "Hodgkin cell" than limited by the name of Reed or Sternberg. Microscopically, these are large cells, with irregular nuclei, usually multiple, with a prominent chromatin net-

work, and often containing nucleoli. The cells range in size from those no larger than a lymphocyte to those 35 or 40 micra in diameter. They may be round, oval or irregular in outline. The larger cells frequently have many irregular protoplasmic projections resembling pseudopodia. There is rarely a distinct cellular membrane although, when fully developed, there are always free cells. The nucleus of the Hodgkin cell is extremely variable, depending on the degree of development from the reticuloendothelium. Sometimes no larger than a normal reticuloendothelial nucleus, it usually becomes larger as the cell differentiates and may have a diameter of 15 to 18 micra. At any stage of development, indentation of the nucleus may occur resulting in the development of two or more lobes. Occasionally the lobes may become completely separated, producing a multinucleated cell, but the majority of the cells are polymorphonuclear rather than polynuclear. Because of the fineness of the connecting strands and the relative large size of the lobes it is very difficult to see the connecting bands. From two to eight or ten lobes may be seen massed in the centre of the cell or arranged in a wreath-like formation around the periphery. Mitotic figures are never seen in any stage beyond the mononucleated cell. The maximal size of the polymorphonuclear cells is rarely more than that reached by the giant mononucleated cells. One of the most characteristic features of the nucleus is the presence of a very prominent nucleolus. In all the cases of Hodgkin's disease examined in the present study they have been present. They are not found in all the cells, but this may be due to not being included in a thin microscopical section. There is never more than one nucleolus to a single round nucleus or one to a lobe of a polymorphous nucleus. They are usually round or oval, from 3 to 4 micra in diameter, and appear dense and solid. With most stains they take a color in sharp contrast to the chromatin. The nucleolus is an integral part of the cell and not extraneous material (inclusion bodies) introduced from without. Leukaemia and lymphosarcoma may closely resemble Hodgkin's disease, but their microscopical pictures never show Hodgkin's cells. Other features described as characteristic of Hodgkin's disease, such as loss of structure of the node, invasion of the capsule, hyperplasia of the reticulum cells, increase in the numbers of eosinophiles and plasma cells, decrease in the number of lymphocytes, and fibrosis, are not specific for Hodgkin's disease, either singly or collectively and occur in other diseases of lymph nodes. Hodgkin cells are not present in every lymph node in Hodgkin's disease, but in their absence a positive diagnosis cannot be made.—*Hodgkin's Disease, with Special Reference to Its Differentiation from Other Diseases of the Lymph Nodes, E. L. Potter, Arch. Path., February, 1935, xix, 141.*—(*J. S. W.*)

Pulmonary Aspergillosis.—A case of pulmonary aspergillosis is reported in a man of 46. The patient had been ill for over a year, suffering from cough, and very abundant, purulent expectoration, which later became foetid and bloody. There was complete loss of appetite, on account of the foetid expectoration. There was no fever, pain or night-sweats. The X-ray picture showed a dense infiltration in the middle third of the left lung. The sputum was negative for tubercle bacillus, but showed a fungus which, through repeated cultures and inoculations in pigeons was later identified as Aspergillus Fumigatus (Frésenius). Treatment with sodium iodide by mouth and in injections resulted in great improvement after 15 days, and in almost complete disappearance of the X-ray shadow after 3 months. *Aspergillus fumigatus* is found most frequently on the surface of certain seeds and starches, and those persons who handle such products—farmers, grain-merchants, millers—are the ones usually affected with the disease. In the majority of cases, the aspergillus grows secondarily on soil already prepared by former conditions, such as bronchitis, bronchiectasis, gangrene, etc. The symptomatology of pulmonary aspergillosis is very similar to that of tuberculosis. Its evolution is very slow, the stethoscopic signs are alike, and the sputum shows unicellular spores and filaments, instead of the tubercle bacillus. In order to avoid errors due to the contamination of the sputum with spores from the air, the microscopical examination should be made, if possible, immediately after expectoration. The patient must expectorate into a sterile Petri dish. It is not rare to find aspergillosis and tuberculosis in the same individual. The prognosis in such cases is graver.—*Un caso interesante de aspergilosis pulmonar, G. Triviño, M. Cambronero and J. Esteban, El Siglo Médico, January 12, 1935, xcv, 30.*—(*J. R. P.*)

Aspergillosis of Wild Turkeys in Captivity.—Since 1815 aspergillosis has been reported frequently from all the avian families in Europe and the United States. The usual fungus is *A. fumigatus Fres.* In 1934 the Missouri Fish and Game Commission began propagating wild turkeys in a State game-preserve. Of 2 groups totaling

785-day-old poults less than 200 survived. The disease appeared at 5 days, and in the first group the maximum mortality rate was reached at about 15 days while in the second group it extended over 3 weeks after hatching. Postmortem examination revealed infection of the lungs and adjacent air-sacs. Cultures from the lungs yielded an aspergillus, later identified as *A. fumigatus Fres.* Both groups of poults had been fed a commercial mash and this was found to be heavily infected with this fungus. It could not be isolated from mash that was autoclaved at 20 pounds for 3 hours. Inoculated with a pure culture, the autoclaved mash was soon covered by the resulting growth. The commercial feed contained codliver oil and fish meal and, under damp conditions, proved a good medium for the development of *A. fumigatus.—Aspergillosis of Wild Turkeys Reared in Captivity, A. J. Durant and C. M. Tucker, Jour. Am. Vet. Med. Assn., lxxxvi, June, 1935, 781.*—(*L. F. B.*)

Lung in Tularaemia.—The author reviews 35 cases of diagnosed tularaemia, from the standpoint of analysis of the clinical evidence of pleuropulmonary involvement. The diagnosis was made either by an agglutination test or by recovery of the organism. Physical and roentgenological signs of pulmonary consolidation were detected in seven cases (20 per cent of the entire series). The symptoms of pneumonia in this group were variable and in general were less severe than those seen in ordinary pneumonia. All seven patients had some degree of cough, but usually it was not serious. There was no rusty sputum. The sputum was profuse and bloody in one instance in which there was also a pulmonary abscess. Chest pain was absent in five, but it was severe in two. Some patients had chills at the time of the onset of tularaemic symptoms, but chills were absent at the beginning of the pneumonia. The temperature fluctuated from 103 to 106°F., and in those patients who survived, the fever remained after the disappearance of signs. The leukocyte count was within the limits of normal with the exception of one case. Three of these seven patients died. Bronchitis was diagnosed clinically in twelve cases. In only seven of these twelve was the bronchitis uncomplicated. All these patients had a moderate to severe cough, generally beginning within a week of the tularaemic inoculation and continuing for from a few days to more than thirty months. None of the patients experienced chest pain. The dyspnoea recorded in one instance was probably of cardiac origin. A diagnosis of pleural effusion was made in four cases in this series. Pleural effusion was found once at necropsy in a pneumonic case; the diagnosis in the other three was made during life and the fluid aspirated and studied. High fever, relatively slow pulse rates and normal leukocyte counts characterized all three cases. Clinical evidence of pleuropulmonary involvement was therefore found in seventeen of the thirty-five cases. In regions in which tularaemia is prevalent, the disease should be considered when suspected pulmonary tuberculosis cannot be proved. It has been a local custom to secure tularaemic agglutinations in all unusual chest conditions, and three of the reported cases were recognized as tularaemia only as a result of this routine procedure.—*Pulmonary Manifestations in Human Tularaemia: A Clinical Study Based on Thirty-Five Unsel ectedCases, S. D. Blackford, J. Am. M. Ass., March 16, 1935, civ, 891.*—(*G. L. L.*)

Chest Roentgenograms in Tularaemia.—Roentgenological chest studies are reported of 34 of a total of 35 cases of tularaemia diagnosed by agglutination or recovery of the organism. Roentgenograms were obtained in 18 patients during the active stage of the disease, eight of these returning after recovery for further roentgen examination. Chest films after recovery were made in 16 of the remaining cases. The films have been interpreted in accordance with the following classification: pulmonary consolidation, 7; peribronchial thickening, 7; pleural effusion, 3; nodular infiltration, 1. Tularaemic pneumonia appears to be primarily a bronchopneumonia with a lobular type of involvement, often accompanied by areas of focal necrosis. Confluence of the lobules may lead to large areas of caseous consolidation, in which cavitation may be found if secondary infection is present. Roentgen studies of tularaemic pneumonia give results in accord with its known pathological changes, but the diagnosis cannot be made by chest-films alone. The necropsy studies in tularaemic pneumonia show that it is primarily lobular in type, which implies that the inflammatory changes should produce the picture of peribronchial thickening in roentgen films. This roentgenological finding may represent bronchitis, peribronchitis, fibrosis or a combination of the three. Observations prove that tularaemia must be considered as a rare but possible cause of pleural effusions. The roentgen examinations of the chests in this series were of no assistance in identifying the tularaemic nature of the effusions. Lymphadenitis in the hilar region was noted in the three necropsies of the series, and it was found roentgeno-

logically in the fourth fatal case. It seems probable that enlargement of the hilar lymph nodes is a frequent occurrence in severe tularaemic infections. Eight of the group in whom films were made during the active stage of the disease returned for further roentgenological observation. Sixteen of the patients had their first films made at some time subsequent to three months after the infection. The 24 films in this recovered group have been reviewed and classified as follows: peribronchial thickening alone, 9; peribronchial thickening with apparently an excess of calcium, 11; apparently in excess of calcium alone, 4; mediastinal enlargement, cause undetermined, one, and within normal limits, two. Calcification in this series generally appeared to be greatly out of proportion to that seen in comparable groups without tularaemia, and in one instance it was thought that a definite increase in calcium deposit could be noted in films taken six weeks after recovery. There are so many points of similarity in the body's reaction to tuberculosis and to tularaemia that it would not be surprising to find that tularaemia also produced calcification in the lungs.—*Pulmonary Manifestations in Human Tularaemia; A Roentgenologic Study Based on Thirty-Four Unselected Cases, V. W. Archer, S. D. Blackford and J. E. Wissler, J. Am. M. Ass., March 16, 1935, civ, 895.*—(*G. L. L.*)

Malaria and Tuberculosis.—In 76 patients ill with far-advanced pulmonary tuberculosis and malaria, the tuberculosis did not alter the patient's resistance to the malarial organism. The febrile attacks were readily controlled with quinine. The effect of the malarial attacks on the tuberculosis patients was rather beneficial, the phthisical process often becoming quiescent. The number of patients with tuberculosis alive five years after the onset, was greater in those with malaria as a complication, while the number of deaths in the same group was less than in a similar group without malarial disease.—*On the Question of Tuberculosis in Malarial Patients, G. Torosian, Bor. S. Tuberk., January, 1935, xiii, 79.*—(*W. A. Z.*)

Varix of Pulmonary Vein.—The fourth case of varix of the pulmonary vein is reported. The fact that no cases were reported prior to 1907, and none have been diagnosed antemortem, suggests that these cases occur but escape clinical recognition. Clinically, the 4 cases had signs and symptoms pointing toward an intrapulmonary lesion. A white woman, 57 years of age, had constant thoracic pain in the back and precordial region, some cyanosis, and a small amount of cough and expectoration for years, clubbing of the fingers for five years, and a transient paresis of the left arm and leg three months before her death. Three years before, a roentgenogram showed a shadow in the left lung field which was considered a metastasis from a hypernephroma or an aneurysm of the aorta. The temperature, pulse, respiration, blood-pressure, urine, blood count, spinal fluid and blood serology were negative. There was an area on the posterior surface of the left chest which had increased tactile fremitus, dulness with bronchial breathing, and numerous inspiratory râles. Roentgen examination revealed a well-circumscribed, lobulated tumor-like shadow of even density occupying the upper lobe of the left lung. In the posteroanterior view this fused with the heart and diaphragm, but roentgenoscopically it could be separated from the heart and ascending aorta. Postmortem examination revealed a pulmonary varix, diffuse bronchiectasis and some atelectasis of the left upper pulmonary lobe, and focal, recent cortical encephalomalacia in the region of the right parietal lobe (no emboli in the cerebral arteries). The sharply circumscribed shadow of pulmonary varix serves to distinguish it from tuberculous lesions, lung abscess and other inflammatory conditions. If a nodular periphery is present on the roentgenogram together with symptoms of cyanosis, dyspnoea, cough, clubbing of the fingers or toes, and intermittent haemoptysis, with an absence of serological and clinical evidence of echinococcus infestation, one should think of a pulmonary varix.—*Varix of the Pulmonary Vein, B. H. Neiman, Am. J. Roentgenol., November, 1934, xxxii, 608.*—(*E. M. J.*)

Prognosis in Pulmonary Tuberculosis.—The temperature, body-weight and pulse range are among the most helpful aids to prognosis in chronic pulmonary tuberculosis; and the presence or absence of tubercle bacilli in the sputum is of great importance. Clarke has shown that of 700 patients discharged from the Forster Green Hospital, Belfast, at the end of a six-year period, 72.5 per cent of the sputum negative cases were alive as compared with 22 per cent of the rest. Those who get the advantage of institutional treatment live longer than those who do not. Collapse therapy has considerably improved the outlook for many cases. Physical signs are of little value in estimating the activity or prognosis in pulmonary tuberculosis. Serial X-rays are a better guide to the extent and character of the disease, but it is still true to say that the nature of the disease present can be assessed best by a study of the symptoms. The

quality is more important than the extent of the disease in prognosis. In the after care the avoidance of overfatigue of any kind is most important. Fatigue is more readily engendered where discontent troubles the spirit, and this may go with idleness or inappropriate occupation as well as with unhappiness from other causes. The calling in which a patient has experience is generally the easiest and should not be readily abandoned. Too much influence has been placed on climate. Chief among the factors upon which the prognosis depends when symptoms of active pulmonary tuberculosis have developed are the age, the economic position, the temperament and psychological make-up of the patient, the amount and nature of the disease and of the constitutional reaction, and the degree of skill shown in treatment. It is well to remember that unaided nature generally permits the invalid to live longer than the physician expects. Although the application of mechanical methods of treatment with the object of repairing diseased organs often are a great aid to recovery, they sometimes shorten life. There is still much truth in the late Samuel Gee's aphorism: Never attempt to forecast the probable duration of the life in a case of phthisis; in this connection there is only one thing that is sure, and that is that if you do you will be wrong.—*Prognosis in Chronic Pulmonary Tuberculosis, S. V. Pearson, Lancet, March 23 & 30, 1935, ccxxviii, 692 & 759.*—(*B. T. McM.*)

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